Mirage DSK-1

Musicians Manual

If you're like most of us, you've probably already hooked up your Mirage and reached some level of limited success in making it work. This manual is a simple and straightforward presentation of the Mirage that will take you to an intermediate level of sophistication. An Advanced Sampler's Guide is available from your authorized Ensoniq Dealer for those who wish to use the Mirage in technically and artistically complex situations.

We suggest that you read the manual from front to back covers, including the GLOSSARY and PARAMETER APPENDIX. The Mirage has a great many performance features that will make your life easier if you'll familiarize yourself with them. The terminology may seem a bit foreign at first, but as you use the Mirage you'll quickly adapt to the terms and their definitions. The Mirage is a very logical instrument and we've presented the information about it in a logical building block fashion.

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INTRODUCTION

When it was introduced in 1984, the Mirage Digital Sampling Keyboard made history by being the first truly affordable sampling keyboard - the Mirage put sampled sounds into the hands of musicians who didn't have the price of a house to spend on a keyboard. It has gone on to become the most popular sampler ever made. It is also the best supported, with hundreds of sounds available on diskette from ENSONIQ and other third party developers, as well as a wealth of computer software and other peripherals.

The Mirage DSK represents a continuation of ENSONIQ's commitment to providing its customers with low-cost, high-quality musical instruments. Thanks to a series of design improvements and more efficient production techniques, it is possible to offer an instrument with the same fine sound quality and virtually all the features of the original Mirage at a substantially reduced price. Plus, the Mirage DSK features the added enhancement of stereo circuitry.

All the sounds ever developed for the Mirage will play on the Mirage DSK, including the popular ENSONIQ Sound Diskette Library, which covers the full range of musical instruments and other effects. See your ENSONIQ dealer for details about the Sound Library.

The Mirage is an eight-voice polyphonic digital sampling keyboard instrument - in many ways similar to and in just as many ways different from a synthesizer. The Mirage allows you to personally program sounds like many synthesizers and also features an on-board sequencer. But, in addition, the Mirage will permit you to sample just about any sound you hear and create music with it.

It's best described as a computer specially designed to reproduce and process sound. Like all computers, it is a system consisting of two main parts--hardware and software. And here's where it differs most from synthesizers.

Hardware

The hardware of the Mirage is everything that comes in the box with the exception of the information on the mini-diskettes. The hardware itself cannot make any sound. It's an engine without fuel. What the hardware can do is reproduce process and modify the sound information included on the diskettes.

Software

The information contained on the mini-diskettes is called software; this information consists of all the data necessary for the Mirage hardware to reproduce a sound. When this information is transferred, or loaded, into the memory of the Mirage, the hardware is ready to reproduce that sound or modify it in a nearly unlimited number of ways.

You, the user, can create your own software by taking sounds you record with the Mirage hardware and transferring that information onto a specially formatted Mirage diskette for future use. This process is called saving.

Because all of the crucial sound information is included as software, your Mirage will never be obsolete. An ever-growing library of sounds is available from Ensoniq that will keep your Mirage fresh and new for years to come.

Digital Sampling

As it applies to music, digital sampling is a computer term that basically means "recording," In concept, it's very similar to tape recording--an electronic representation of a sound, or audio signal, is stored in some location where it can be read and changed back into a sound at some future time.

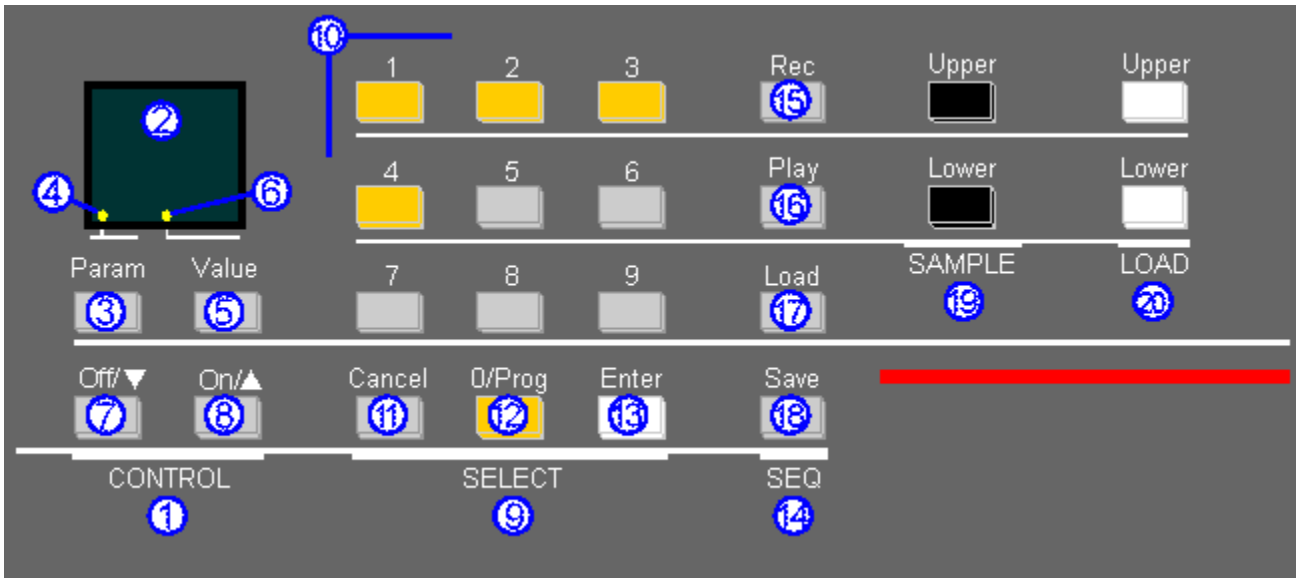
Tape recording uses audio tape to store the audio signal. Digital sampling uses sophisticated digital circuitry (and eventually, computer diskettes) to store the signal. In digital sampling, the signal is stored as bits of computer information. While in this digital form, the signal can be modified in many ways, without deteriorating the audio quality and without the mechanical limitations of tape recording.

THE FRONT PANEL

The Mirage control panel contains a logical array of multi-function buttons and a status display that will show you all you need to know about what's going on inside the Mirage at any given time.

Many modern digital and digital/analog synthesizers utilize a multi-function control panel, so you may already be familiar with its use. If not, you will find that you'll adapt to the concept rather quickly and will soon be breezing across the panel like an expert.

The following sections of the manual will give you detailed instructions on how to use the panel for specific functions. Here is a general description of the controls and their function.



1. CONTROL

This section of the panel contains the display and controls parameter values, switching functions and commands.

2. Display

This display is alpha-numeric, that is, capable of displaying letters as well as numbers. When sampling, the display also functions as a peak level indicator. The PARAMETER APPENDIX contains all the specific information about reading and interpreting the display. A flashing display means that the Mirage is asking you a question or telling you something is wrong.

3. Param

Pressing this button will show you which parameter is selected and ready to be adjusted. The number of the selected parameter can be changed using the SELECT keypad.

4. Param Indicator

When this LED is lit, the display is showing a parameter number.

5. Value
Pressing this button shows the numerical value of the selected parameter. Rather than knobs or switches, the Mirage uses a scale of numbers to describe the operating range of any of the parameters.

6. Value Indicator
When this LED is lit, the display is showing the value of the selected parameter,

7. OFF /
Pressing this button will decrease the parameter value number. Pressing the button intermittently will decrease the value one digit at a time. Holding the button down will change the value at an accelerating rate. This is also the OFF button for switching functions,

8. On /
Pressing this button will increase the parameter value number. Pressing the button intermittently will increase the value one digit at a time. Holding the button down will increase the value at an accelerating rate. This is also the ON button for switching functions.

9. SELECT
The SELECT section gives you access to many Mirage functions, from parameter selection to programming, sequencing, sampling and editing functions.

10. Numeric Keypad
The numeric keypad is used to select parameters, sounds, and programs, and to determine which sounds and patches will be transferred to the diskette.

11. Cancel
This button is used to abort commands and halt functions such as sequencing. It is also used to cancel editing functions before they are entered into the Mirage memory. Virtually any command or function can be canceled with no harmful effect as long as CANCEL is pressed before the event occurs.

12. 0/Prog
Each sound in the Mirage has four preset parameter programs numbered 1 through 4. This key will display the current program and keyboard half containing that program. Pressing the button repeatedly will alternately show the current program on the other keyboard half. Pressing the button and then any number between 1 and 4 will change the program to that number for that keyboard half.

13. Enter
This button is used to begin the transfer of sounds between the Mirage memory and diskettes, to execute commands and to initiate sampling and sequencer functions, Any command or function which dramatically alters the Mirage memory or diskette information will require you to press ENTER for final confirmation.

14. SEQ
The buttons in the sequencer section are used in conjunction with the ENTER and CANCEL buttons in the Select section to record sequences, playback sequences, load sequences from diskettes into the Mirage memory and save sequences on diskettes.

15. Rec
This button is used to record and overdub sequences. Pressing the button twice and then playing the Mirage will record a new sequence, while pressing the REC button followed by the PLAY button will permit overdubbing a previous sequence.

16. Play
To play back a sequence, press the PLAY button and the sequence will play back as recorded. Pressing the PLAY button while a sequence is already playing will restart the sequence from the beginning, The sequence can be interrupted at any time by pressing the CANCEL button.

17. Load
To load a sequence from a diskette into the Mirage memory, press the LOAD button and then the number of the sequence (1-8) you wish to load. Pressing the ENTER button will start the loading process.

18. Save
To save a sequence you have recorded by transferring if from the Mirage memory to diskette, first insert a formatted diskette into the drive. Next, press the SAVE button and the location number (1-8 on SELECT keypad) where you wish to store the sequence on the diskette. Pressing the ENTER button will begin the saving process. Note that this will replace on the diskette any sequence that was previously saved in that location.

19. Sample Upper/Lower
These buttons are used to set up the Mirage to sample sounds. Consult the SAMPLING section of the manual for detailed instructions.

20. Load Upper/Lower
These buttons are used to load sounds from Ensoniq Sound Diskettes or your own sound library. Pressing either or both buttons will instruct the Mirage to load the sounds into the memory for the upper, lower or both halves of the keyboard. After pressing the Load button(s), select the sound you wish to load (1, 2, or 3) and then press ENTER.

ABOUT DISKETTES

The Mirage uses 3-1/2" micro floppy diskettes to store information. The diskettes are enclosed in a protective plastic carrier with an automatic shutter to protect the diskette from physical damage. It is important not to alter this carrier in any way.

Ensoniq Sound Diskettes are shipped "write-protected", that is, protected against accidental erasure while in the Mirage disk drive. We recommend that you do not store sounds on a Sound Diskette without first making a backup copy of the Sound Diskette on a Formatted Diskette. Formatted Diskettes contain the Mirage operating system data, but do not contain any sound information. They can store up to three sounds with four programs each, and up to eight 333-note sequences. In order to save sounds and sequences and make backup copies of Sound Diskettes, you must use Formatted Diskettes. You can format your own diskettes using the Formatting Diskette that came with your Mirage. See the section on the Formatting Diskette for complete details.

Diskettes have a sliding write-protection tab so that you can protect your own sounds and programs against accidental erasure. Sliding the write-protection tab in the lower left corner of the diskette so that the window is closed will allow you to store information on the diskette. Sliding the tab so that the window is open will protect the diskette against over-writing and erasure. If you try to write, or "save" data to a protected diskette, the Mirage display will respond "Pd", for Protected Diskette, and the data will not be saved. To save data to a protected diskette you must first slide the tab to the closed position.

DO'S AND DON'TS

Diskettes are a magnetic storage medium and should be treated with the same care that you'd give important audio tapes. Here are a few do's and don'ts.

- Keep diskettes away from magnetic fields. Exposure to magnetic energy can permanently damage the information on the diskette. Keep them away from speaker cabinets, tape decks, power cables, airline x-ray equipment, power amplifiers, TV sets and any other source of magnetic energy.
- Avoid extremes of temperature. Temperatures below 50 F and above 140' F can damage the plastic carrier.
- Keep the carrier clean. Don't allow liquids to come in contact with the carrier or diskette and don't touch the diskette with your fingers.
- We strongly advise that you keep a written record of sounds, programs and sequences stored on your diskettes to facilitate loading the right sounds and to avoid writing over sounds and sequences you want to save. For maximum protection, always make back-up copies of your sounds on Formatted Diskettes.
- ***Diskettes should not be left in the disk drive when the Mirage is switched on or switched off. Diskettes should not be inserted or removed while the red disk drive light is on.***

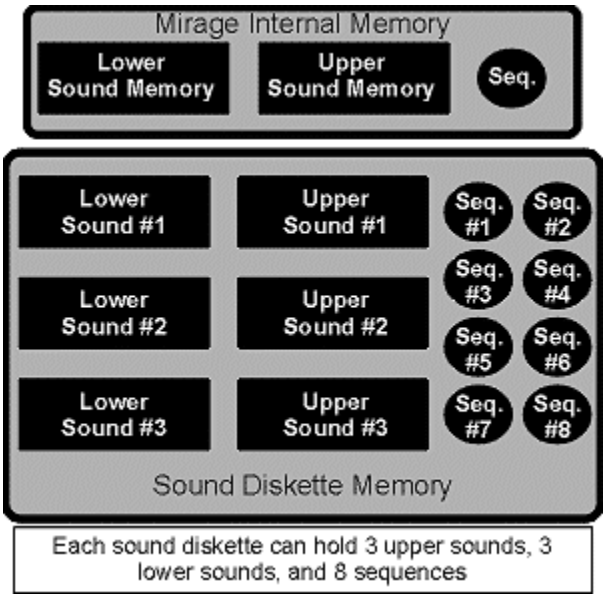
ABOUT MEMORY

Disk Memory

The sound diskettes which came with the Mirage each contain three Upper and three Lower sounds. Each Upper and Lower sound is composed of 64k of sound data - about 64,000 bytes of information - plus the four programs and all the individual wavesample parameters which control the tuning, keyboard range, volume, etc. for each wavesample.

Internal Memory

The internal memory of the Mirage consists of two 64k banks of memory. The Lower bank will hold the data from one Lower sound off the disk; the Upper bank will hold the data from one Upper sound off the disk. The internal memory only contains one Upper and one Lower sound at a time. To play another sound, you must load it from a diskette, which will replace the current sound in the internal memory. Once a sound is loaded into the internal memory, you can change it in any way you wish without affecting the data on the diskette. The data on the diskette is not affected unless you save the modified data over the original. Generally, it's better to save your changes to a blank formatted diskette, leaving your factory sound disks intact.



Each sound diskette can hold 3 upper sounds, 3 lower sounds, and 8 sequences

Always remember this: the data in the internal memory is volatile. That means that when you turn the Mirage off, it's gone. Any sounds you sample, or changes you make to the factory sounds, must be saved to a formatted diskette if you wish to keep them around for future use.

In many cases, as with the piano and the bowed strings, the same-numbered Upper and Lower sounds are related, and are designed to be loaded together and used as a single, full-keyboard instrument. In other cases, the same-numbered Upper and Lower sounds are totally different. A bass sound doesn't need to cover the entire keyboard; nor does the range of a sax normally extend down a full five octaves. In such instances, different Upper and Lower sounds have been placed together on the disk.

Custom Splits

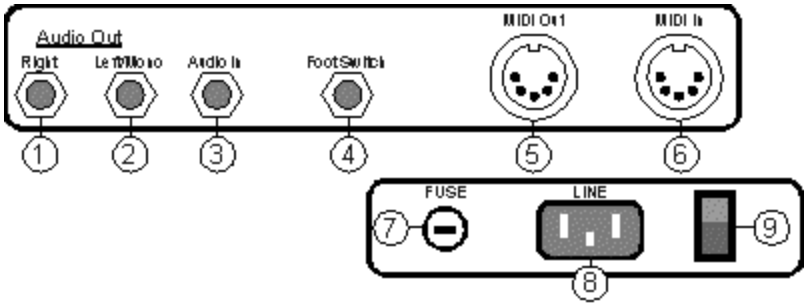
Any Lower sound can be loaded in the Mirage along with any Upper sound. Suppose, for example, that you want the piano sound in the lower half, and the sax in the upper half. Simply load Lower Sound #1 from the diskette with the Piano, and then load Upper Sound #1 from the diskette with the Upright Bass & Sax, as described in the section CHANGING SOUNDS. Now you have, in the Mirage's internal memory, piano in the Lower and sax in the Upper keyboard. You can now save this combination to a blank formatted diskette (see SAVING SOUNDS AND PROGRAMS) so that you can later load them in together, By making your own custom disks in this way you can optimize your performance set-up.

Sequence Memory

As with sound data, the Mirage has a section of its internal memory reserved for storing sequences that you record or load from diskette. The internal memory holds one 333-note sequence. Loading a sequence from diskette will replace the sequence in the internal memory. Overdubbing or recording over a sequence in the Mirage internal memory will not affect the sequence data stored on a diskette, unless you deliberately save the new sequence over an existing one. See the Sequencer section for details on recording, saving and loading sequences.

INPUTS AND OUTPUTS

The back panel of the Mirage contains inputs and outputs for power, audio signal, Foot Switch and MIDI interface connections. Several of these connections have multiple functions that are controlled by parameters from the front panel. Consult the PARAMETER APPENDIX for a complete description of the parameters and their functions.



1. Right Audio Out

When using the Mirage in stereo (see Page 9), connect this jack to one channel of your mixer and pan that channel right. When nothing is plugged in here, all audio will be routed to the Left/Mono output. Specs: Low impedance, high gain audio output. Nom. output 800mV. Impedance 1K ohms.

2. Left/Mono Audio Out

To run the Mirage in mono connect this jack to your mixer or amplifier. When nothing is plugged into the Right Output, all audio will be routed to this output. When using the Mirage in stereo, connect this jack to one channel of your mixer and pan that channel left. Specs: Same as Right Audio Out

3. Audio In

Audio input switchable between line and mic levels, Parameter 75 (LINE INPUT ON/OFF) controls the level select. The line level input wi11 accept signals of up to 1 V, impedance 20K ohms. The mic level input will accept signals of up to 100mV, impedance 200K ohms,

4. Pedal/Footswitch

This connection is for the Sustain Pedal/ foot- switch (Model SW-1), Its function is controlled by parameter 89 (SUSTAIN PEDAL/FOOT- SWITCH SELECT).

5. Midi Out/Thru

This jack sends out Musical Instrument Digital Interface (MIDI) information from the Mirage to other instruments and computers. In the MIDI THRU MODE (parameter 83), it also echoes all MIDI inputs.

6. Midi In

The input for MIDI information. The MIDI IN jack is controlled by parameter 81 (MIDI OMNI MODE ON/OFF), and parameter 82 (MIDI CHANNEL SELECT).

7. External Fuse Holder.

1 Amp fast-blow Fuse socket.

8. Line

The supplied AC line cord should be connected here. The correct voltage for the Mirage is listed on the Serial Number label on the rear panel. If you travel, remember that the Mirage will only operate on this voltage.

9. Power

Rocker switch to turn power on and off.

Many problems encountered with electronic instruments are in the connections. It is wise to use only high quality cables and connectors and to keep them in good condition. We also recommend that you double check all connections every time you set the Mirage up to play.

STEREO OPERATION

One new feature of the Mirage DSK which was not available on the original Mirage is stereo operation. When the Mirage DSK is connected in stereo to a mixer or stereo amp, each of its eight voices will appear in a random location in the stereo spread.

How does it work?

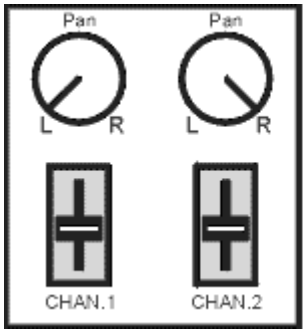
Imagine the area between your speakers divided into eight equal zones, or pan locations. When your Mirage is connected in stereo, and each channel is panned as shown at the right, any note you play might come from any of these eight locations. The next note you play will come from another location. The assignment is totally random - there is no way to control or predict where a given note might show up in the mix.

This effect works best on sounds like string pads, background vocals, etc., where you are mostly playing sustained chords. Used in this context the stereo effect can be quite stunning, with the different notes of a chord all panned to their own locations in the mix. It can also be quite effective in adding some interest and movement to drum and percussion sounds, though you might want to constrain the stereo image a bit with these sorts of sounds (see below).

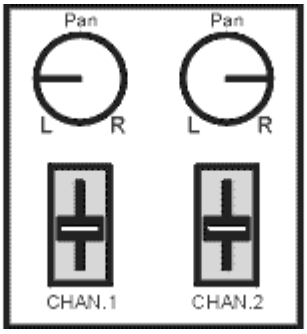
The stereo effect generally works less well when playing solo parts with sounds such as piano, guitar, flute, etc. Basically, the ear does not expect a piano or guitar to be leaping from place to place in the stereo spread as it's played - the effect can be disconcerting. For sounds like these you might want to run the Mirage in mono, or severely constrain the stereo spread,

Constraining the Stereo Image

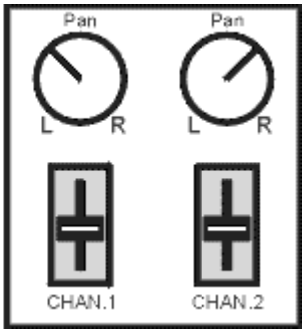
If you connect the Mirage's Left/Mono and Right outputs to your mixer and pan the two channels all the way to the left and right respectively, you will get the maximum stereo spread. For some sounds, as mentioned above, this is great, while for others you might want a less radical version of the effect. By adjusting the pan of each channel closer to the center position, you can constrain, or narrow the stereo spread. Thus the notes you play will still bounce around between your speakers, but by constraining the stereo image you have defined a narrower area in the middle of the stereo field for them to bounce around in.



Full stereo image



Somewhat constrained stereo image



Narrow stereo image

GETTING READY TO PLAY

The Mirage is a two-part instrument - hardware and software. By itself, the hardware won't make a sound. It needs the information on the diskettes to start doing its work. Getting this information into the right location in the hardware is known as **Loading**.

The first diskette you put in the drive when you turn the Mirage on is very important, because the Mirage takes its operating system from this disk ("boots" from that disk, in computer terms). The operating system tells the Mirage hardware what to do. Because it is basically a computer, the Mirage can behave like several totally different machines, with totally different capabilities, depending on which operating system it is "booted" with.

When you turn the Mirage on and insert a diskette, the hardware will automatically load sound #1 and its four programs into the memory. You will have to follow a certain procedure when you wish to change sounds or diskettes. The procedure is quite simple and only takes a few seconds. Here's the complete sequence.

WHEN YOU TURN ON THE MIRAGE

Do this...	***Here's what's happening...***	***Display will show...***	
Turn power switch ON	The electrical power that operates the hardware is ready.	**nd** (no diskette) Flashing	

Insert Sound Diskette	Hold the diskette with the slotted shutter on top, facing forward, and insert it gently into the drive slot until it seats fully in and down.	Display blank, Drive light on	
Wait about 12 seconds	The operating system and sound information is now being transferred from the diskette to the hardware memory. Slight mechanical sounds will be heard coming from the drive.	**.21** (Master Tune) This parameter will always show after the first sound is loaded.	

CHANGING SOUNDS

Once the Mirage is up and running, there is a slightly different procedure to change sounds, either loaded from the same diskette or from a different diskette.

Do this...	*Here's what's happening...*	*Display will show...*	
Press LOAD button(s) either UPPER, LOWER or both	Before loading the actual sound information, you must select whether the sound wi11 be available on the upper half of the keyboard, the lower half, or the entire keyboard.	LU (load upper) or LL (load lower) or LA (load all). Flashing	
Press 1, 2, or 3 on the SELECT Keypad	Each diskette has three sounds, Upper and Lower. Refer to the diskette label for a description of each.	L1 (Load l) or L2 (Load 2) or L3 (Load 3). Flashing	
CANCEL	If you change your mind about which sound you wish to load, press CANCEL and begin again.	Previous parameter before pressing Load button	
- OR - ENTER	This will initiate the transfer of information from the diskette to the Mirage memory	Display blank Drive light on	
Wait a maximum of 8 seconds	Loading a sound into the memory of both halves of the keyboard will take about 8 seconds.	When the Load is completed, the number of the last used	

		parameter will be displayed.	
NOTE:	If there is no sound stored for the number you have selected, the display will flash.	NF (not found) Flashing	

Press any key. Adjust volume	All the sound information is now in the hardware memory. You can now play the sound as loaded or proceed to modify it using any of the playback parameters.	

CHANGING PROGRAMS AND KEYBOARD HALVES

Each sound loaded into the Mirage memory carries four distinct parameter programs along with it. Programs, as defined here are very similar to "patches" on a synthesizer - each program is a set of playback parameters (volume and filter envelopes, filter cutoff frequency, chorusing, etc.) through which the sampled sound is played back. Those programs will always be based on the sound data in the memory. For example, the four programs of the piano sound will all sound different, but they are all simply different ways of processing the piano samples themselves.

We use the program parameters to tailor the sound for playback, to shape its volume and timbral dynamics - either to match those of the original sound or to create entirely new effects, such as chorusing, filter resonance, layering, etc. To see how much difference the programs can make, try loading a few of the sounds from the diskettes that came with your Mirage, and then selecting different programs, as shown below.

Here's the procedure for changing programs.

Do this...	***Here's what's happening...***	***Display will show...***	
Press 0/PROG	This will show you the current program and the keyboard half it is applied to.	L(1, 2, 3 or 4) Flashing	
Press 0/PROG again	Pressing 0/PROG a second time will show the current program for the other keyboard half.	U(1,2,3 or4) for the upper keyboard Flashing	

Press 1, 2, 3 or4on SELECT keypad	You are now telling the Mirage to change to the desired program for that keyboard half.	U(1,2,3 or 4)	

Selecting parameter 25 (UPPER/LOWER PROGRAM LINK) and switching it ON will connect the program select switch to both keyboard halves, so as you change the program for one keyboard half the other will change automatically.

THE SEQUENCER

The Mirage features a 333-note sequencer that will allow you to record and save a performance. Operating very much like a sound-on-sound tape recorder, the sequencer enables you to build up patterns by overdubbing previous sequences. Sequences can be stored on Formatted Diskettes. Before using the sequencer, we suggest that you review the sequencer parameters in the PARAMETER APPENDIX, paying particular attention to the following:

Param.	***Function***
85	External Sequencer Clock Switch
87	Internal Clock Rate
88	Sequencer Loop Switch
89	Sustain Pedal/Footswitch Select

TO RECORD A NEW SEQUENCE

Do this...	***Here's what's happening...***	***Display will show...***	
Press REC button	Turns the sequencer on to standby and is awaiting further instructions.	**rS** (record sequence) Flashing	

Press REC button (2nd time)	You're now telling the sequencer that this is a new sequence. Any sequence in the Mirage memory will be erased as the new sequence is entered.	**rS** Not flashing	
Play any key, Press ENTER button, or Press the Foot- switch (param 89 "on")	Any of these "events" will start the recording process. All notes, key velocity and PITCH and MOD WHEEL changes will be recorded. Any delay between the first "event" and the first key played will also be recorded.	**Sr** (sequence recording)	
Press STOP	Sequencer will stop recording and end the sequence at this point.	(last parameter number used)	
- OR - Press PLAY	The sequencer will stop recording and immediately begin to play the sequence from the beginning.	-The initial value of param. 87 INTERNAL CLOCK RATE	
- OR - Hit the Footswitch (with Parameter 89 on)	You may now accompany the playback without recording further.		

Changing the Playback Speed

You can speed up or slow down the playback of the sequence by changing the value of parameter 87 (see Selecting and Changing a Parameter). Increasing the number will increase the tempo, decreasing the number will slow down the tempo. The Display shows the new value of the internal clock rate.

TO OVERDUB A SEQUENCE

Do this...	*Here's what's happening...*	*Display will show...*	
Press REC	The sequencer is turned on to standby and is awaiting further instructions.	**rS** (record sequence) Flashing	
Press PLAY	The previously recorded sequence will begin to play back immediately and any notes you play will be overdubbed on top of the previous sequence. You can continue to add overdubs until the memory is filled. Note that adding pitch bend or modulation will affect all previously recorded tracks, and will use sequence memory as do notes. Also, the Mirage is an eight voice instrument, so no more than 8 notes can sound at any one time.	**od** (overdub)	

Overdubbing with the LOOP SWITCH "on"

With the LOOP SWITCH (param 88) "on", the sequence will continue to play again and again, with subsequent overdubs layering on top of the previously played notes. This will continue until the STOP button is pressed.

Overdubbing with the LOOP SWITCH "off"

With the parameter 88 "off ', the sequence will play through once while overdubbing and then stop automatically.

Note that any overdubs you perform will be permanently added to the sequence data in the Mirage memory. You can't "remove" the overdubbed notes if you don't like what you played. For this reason, once you have a "basic track" to which you want to add overdubs, save it to a disk (see below) before proceeding with the overdubs. That way, if your first overdub is less than successful, simply load the "basic track" back into the Mirage and try again. Then each time you have a sequence you like, but want to add notes to, save it so that you can reload it and start over in the event of an unsatisfactory overdub.

SAVING A SEQUENCE

Once you've recorded them, sequences can be saved for posterity on Ensoniq Sound Disks and your own Formatted Diskettes. Each diskette can store 8 sequences in addition to its sound data. We highly recommend that you keep a written record of sequence names and their locations (and which sounds they were meant to play back with) to help you find them more easily and to avoid inadvertently recording over them.

TO SAVE A SEQUENCE

Do this...	***Here's what's happening...***	***Display will show...***	
Press SAVE	The sequencer is preparing to transfer all recorded sequence data to diskette	**SS** (save sequence) Flashing	
Press any button1-8 on SELECT keypad	You are now choosing the location on the diskette that the sequence will be transferred to.	**S (1...8)**	
Press ENTER	The sequencer information is now being transferred to the assigned location on the diskette. NOTE: Any sequence previously saved in that location will be erased.	Blank (disk drive light on)	

LOADING A SEQUENCE

A sequence stored on diskette can be loaded into the Mirage sequencer memory in much the same manner that it was saved. The sequence will play using whatever sound is currently loaded into the Mirage. Note that any sequence in the Mirage internal sequencer memory will be erased when the new sequence is loaded from the diskette. Each Ensoniq sound diskette contains three sequences which demonstrate the same-numbered sounds (sequence #1 for sound #1, sequence #2 for sound #2, etc.) Try loading and playing these factory sequences to get the hang of it.

TO LOAD A SEQUENCE

Do this...	*Here's what's happening...*	*Display will show...*	
Press LOAD (in the SEQ section)	The Mirage is now prepared to receive sequence information from the diskette into the internal memory.	**LS** (Load sequence) Flashing	
Press desired sequence number 1 to 8 on SELECT keypad	You are now telling the Mirage which sequence from the diskette you wish to load.	**L (1...8)**	
Press ENTER	The sequence information is now being transferred from the diskette to the sequencer memory.	Blank (Disk drive light on)	

PLAYBACK PARAMETERS

Rather than have knobs, faders and switches to control functions, the Mirage uses multi-function pushbuttons and a digital display to control the parameters for playing and sampling, Simply put, a parameter is a variable for a specific function. Tuning, keyboard balance, filter cutoff frequency and sampling time are examples of individual parameters.

The parameters of the Mirage are divided into two main categories-playback parameters and sampling parameters. The playback parameters have to do with modifying or enhancing a sound that's already in the Mirage memory. The sampling parameters deal with getting the sound from its source into the Mirage memory. We'll save the sampling parameters for later on in the manual and just talk about the playback parameters here.

How To Use The Control Panel

In order to work with the parameters, you'll need some familiarization with the control panel. Since all parameter changes are made using the same pushbuttons, you'll only have to learn the procedure once.

First, some Mirage parameter basics:

- Pressing the **Param** button will display the current parameter number. Refer to the parameter list in the manual or the parameter card to find out what each parameter does.
- Parameter numbers can be changed only by keying the number on the SELECT keypad. All parameters are two-digit numbers. After you enter the first digit, the display will show a flashing "L" or "U", indicating which keyboard half the parameter applies to. The "L" or "U" will be replaced by the second parameter digit as you enter it.
- Pressing the **Value** button will show you the current numeric value or status of the current parameter.
- The value can be changed only by pressing the "On/Up" or "Off/Down" button below the display. When the parameter is a switch function, these are the "ON-OFF" buttons.
- While in the **parameter** mode, the parameter LED will be lit. Pressing the "On/Up" or "Off/Down" button will automatically switch to the **value** mode. While in the value mode, the value LED will be lit.
- Pressing any numeric button on the SELECT keypad will automatically switch to the parameter mode.
- Pressing the "On/Up" or "Off/Down" buttons intermittently will change the value one digit at a time. Holding the button down will cause the value to change at an accelerating rate. This will give you both coarse and fine control.
- In order to hear the change in sound made by a parameter value, it is necessary to play a new note after each value change. A recommended procedure is to play one key repeatedly while changing the parameter value.
- A complete description of all playback parameters is found in the PARAMETER APPENDIX.
- Parameter values are not constant. The value will have a different meaning for nearly every parameter. For example, the MASTER TUNE parameter values are 100 steps (0-99) of 1/20 semitone each, while VELOCITY SENSITIVITY values are 32 steps (0-31) which merely describe the minimum and maximum sensitivity limits.
- Parameters 11-19 are command parameters. They tell the Mirage to perform specific functions, such as saving a particular program or sound, and have no numeric value. Command parameters will always require you to press ENTER to confirm the command, or CANCEL to abort it. After executing the command, the Mirage will display the parameter number.

SELECTING AND CHANGING A PARAMETER

Here is a quick rundown of the general procedure.

Do this...	*Here's what's happening...*	*Display will show...*
Press PARAM button	The Mirage is prepared to modify any one of the parameters.	The number of the last used parameter. PARAM LED lit.
Enter the parameter number on SELECT keypad. Press 2 then 1.	You're now telling the Mirage which parameter you wish to work with.	Parameter number (20-99)
Press VALUE button	The Mirage will show you the current value of the parameter.	Current value number. Value LED lit.
For number values press or	The Mirage will adjust the value of the parameter up or down as much as you wish.	The value number will increase or decrease.
For switch functions press On or Off	The Mirage will electronically and noiselessly switch the function.	**on** or **oF**

GENERAL PARAMETERS

There are four general playback parameters - MASTER TUNE, PITCH BEND RANGE, KEYBOARD VELOCITY SENSITIVITY and KEYBOARD BALANCE. These parameters will always apply to the entire keyboard. You needn't adjust them every time you turn the Mirage on - they will automatically come up as default values. If you want, you can change these settings and save the new values to diskette (Param. 14). Then you can later use that diskette to "boot" the Mirage, and your new values for these parameters will be loaded in automatically, as part of the operating system.

21 / MASTER TUNE

The MASTER TUNE will automatically set itself (default) to A440 (VALUE 50). It is adjustable over a five semitone range in increments of 1/20 semitone.

22 / PITCH BEND RANGE

The PITCH BEND RANGE will automatically set itself (default) to whole step (VALUE 2). It is adjustable over a two octave range, (one octave up, one octave down) in increments of one semitone.

23 / KEYBOARD VELOCITY SENSITIVITY

The KEYBOARD VELOCITY SENSITIVITY will automatically set itself (default) to the touch of the average player (VALUE 30). Players with a heavier than average touch should use the lower values and players with a light touch should use the higher values.

24 / KEYBOARD BALANCE

The KEYBOARD BALANCE will automatically set equal levels for the upper and lower halves of the keyboard (VALUE 32), The parameter works very much like a pan pot with the higher numbers favoring the upper keyboard and lower numbers favoring the lower keyboard.

SAVING SOUNDS AND PROGRAMS

As with a synthesizer, any sound you load into the Mirage can be modified extensively using the playback parameters. Before too long (probably later this evening), you'll want to save the programs you've personally created, or samples you've made. To do that, you'll need a blank Formatted Diskette.

Formatted diskettes (which you can create yourself using the Formatting Program that came with the Mirage) have the same set-up as Ensoniq Sound Diskettes. Each one can store three sounds,

Upper and Lower, with four programs per sound. Ensoniq Sound Diskettes are shipped write protected to eliminate the possibility of erasing any of the sound information, Of course you can, if you want, save data to a Sound Diskette just as you would a blank disk, but remember this will erase the data that's on the disk.

Saving a Sound on a Formatted Diskette

Each sound on an Ensoniq Sound Diskette carries four programs with it. Once a sound is loaded into the Mirage memory, any or all of the programs can be modified. When you've modified the programs to your satisfaction, or sampled a sound of your own that you want to save, insert a Formatted Diskette and do the following:

Do this...	***Here's what's happening...***	***Display will show...***	
Select parameter: 11 / SAVE LOWER 12 / SAVE UPPER 13 / SAVE BOTH	You're telling the Mirage which keyboard half (or both) to save.	**SL** (save lower sound) **SU** (save upper sound) **SA** (save both) Flashing	
Enter 1, 2 or 3 on SELECT keypad	You're telling the Mirage which location on the diskette you want the sound transferred to.	**S1** (sound 1) **S2** (sound 2) **S3** (sound 3)	
Press ENTER	All the information about the sound and programs is now being transferred to the assigned location on the diskette.	Display blank Drive light on	
LABEL THE DISKETTE	When the drive light goes out and the display comes back on, the transfer of information has been completed. Remove and label the diskette.	**11, 12,or 13** depending on which half (or both) you chose to save	

COPYING PROGRAMS INTERNALLY

It's not unusual to want to modify a program, yet still retain the original. For example, let's say that you're not too fond of piano program #4 and would like to have a modified version of piano program #1 in its place, while still retaining the original program #1.

The Mirage will allow you to copy the program from location #1 into the #4 location. You can then modify it, ending up with programs #1, 2 and 3 intact, and #4 as your personal modification of #1. Here's how to do it, First make sure that program #1 is selected. Then:

Do this...	***Here's what's happening...***	***Display will show...***	
Select parameter 15/COPY PROGRAM TO LOWER or 16/COPY PROGRAM TO UPPER	You are preparing the Mirage to copy the current program into another location. In our case we will be copying the lower program #1 into the lower program #4 location, so select parameter 15.	**LC** (lower copy) OR **UC** (upper copy) Flashing	
Press 4 on SELECT KEYPAD	You are now telling the Mirage the location into which you will copy the current (#1) program.	**L4** (to lower 4) or **U4** (to upper 4)	
Press ENTER	The Mirage is now duplicating the program parameters of program #1 into the program #4 location.	**15** or **16** (the copy parameter)	

Program #4 is now a copy of program #1.You can modify it to your taste by changing any or all of the playback parameters. When you've finished your programming session, you are ready to save the entire sound on formatted diskette as described on the previous page.

NOTE: This procedure copies only the program information (the set of parameters which control the playback of the sound), not the sound data itself. Copying the sound data to another memory location, or to the other memory half, requires MASOS (Mirage Advanced Sampling Operating System) which is available from your Ensoniq dealer.

USING THE FORMATTING DISKETTE

The Formatting Diskette is used to format blank (or raw) 3 1/2" disks, or to reformat disks which have been configured for a different machine (such as a computer), so that they can be used to store Mirage sound data. Blank diskettes are available from any computer store. You should use high quality Single-sided, double-density (SSDD) 3 1/2" disks. The program on the Formatting Diskette lets the Mirage create a blank formatted diskette with the current version of the operating system on it. The Formatting Diskette can also "clone" itself, allowing you to make a backup copy.

"REBOOTING" THE MIRAGE

To use the Formatting Diskette you must first "boot" the Mirage with that diskette. Booting (or starting up) the Mirage from the Formatting Diskette loads a special operating system into its memory, one which specializes in one function - formatting diskettes.

Booting the Mirage from the Formatting Diskette can be done in one of two ways.

1. Turn the Mirage power off, and then back on. The display will flash "Nd". Insert the Formatting Diskette into the disk drive. The Mirage will boot from the disk, loading the formatting program into its memory. Or,
2. Insert the Formatting Diskette into the disk drive. Press **Load Upper**, **Load Lower**, "**0**", **ENTER**. The Mirage will reboot from the disk in the drive, as if it had just been turned on. This is called a "warm boot". (Note that this will wipe out the current contents of the Mirage's memory. Save any important sound data first.)

TO FORMAT A DISKETTE

This will format a blank disk to accept sound data and will put the operating system on it, so that you can later use that disk to "boot" the Mirage for normal operation.

Do this...	***Here's what's happening...***	***Display will show...***
Boot the Mirage with the Formatting Diskette as described above	The formatting program is loaded into the Mirage memory	**Fd** (Format Diskette)

Insert the diskette to be formatted into the disk drive. Press "1"	You are telling the Mirage which function you want to perform	**Fd** (Format Diskette) flashing	
Press ENTER.	The Mirage is now putting the formatting information and the operating system on the diskette. This will take a couple of minutes.	Display blank Drive light on	

When the procedure is finished, the display will read "Fc" (for Formatting Complete) and the diskette in the drive will be formatted and ready to use for saving Mirage sounds. If the display reads "Pd" the disk is protected. A display of "dE" means Disk Error and indicates a bad diskette.

You should put a label on the diskette, noting which version of the operating system it contains (the version number is written on the Formatting Diskette itself). To format another diskette, simply repeat the above procedure (except that you don't need to reboot the Mirage each time).

TO MAKE A BACKUP COPY OF THE FORMATTING DISKETTE

This will reproduce the exact contents of the Formatting Diskette onto the disk in the drive, allowing you to make a Backup copy. First, boot the Mirage with the Formatting Diskette as described on the previous page. Then,

Do this...	***Here's what's happening...***	***Display will show...***	
Insert the diskette to be copied over into the disk drive. Press "2"	You are telling the Mirage which function you want to perform	**bU** (Backup) Flashing	

Press ENTER	The Mirage is making an exact copy of the Formatting Diskette onto the disk in the drive.	Display blank Drive light on	

When it is finished, the display will read "bc" (for Backup Complete) and the diskette in the drive will be an exact copy of the Formatting Diskette. It's not a bad idea to make such a backup, in case anything should happen to the original.

RETURNING TO NORMAL OPERATION

Once you have finished using the Formatting Program and wish to return to normal operation, you can reboot the Mirage from a standard sound diskette without turning the machine off.

Do this...	***Here's what's happening...***	***Display will show...***	
Insert a diskette with an operating system into the drive. Press 0/Prog	You are telling the Mirage that you want to "reboot" from the disk in the drive	**rb** (Reboot) Flashing	
Press ENTER	The Mirage is loading the operating system and Sound #1 from the diskette in the drive, just as it does when you first turn it on	Display blank Drive light on	

Cancel

You can press Cancel instead of Enter during any of the above steps if you change your mind, or want to make sure you have selected the right function.

SAMPLING

Sampling your own sounds with the Mirage is where the fun really begins, Just about any sound can be a source of inspiration for you, since just about any sound can be recorded and processed with the Mirage. Acoustic sounds can be sampled by using a microphone, while electronic or recorded sounds can be connected directly to the Mirage's line level input.

As you become more familiar with the Mirage and the sampling process, you'll begin to realize that your creative possibilities are limited only by your imagination. First, here's a little background to help you understand the process better.

DIGITAL RECORDING

As we hear them, sounds are energy patterns. In the air, this energy moves the parts of our ears, creating electrical impulses that our brains can decipher, In tape recording, this energy moves some part of a microphone, creating electrical impulses that are recorded electromagnetically on magnetic tape.

In digital recording, the electrical impulses that represent the sound are converted into a series of numbers which are recorded in a computer memory.

The analog signal is converted to a digital signal by the Analog to Digital Converter (ADC). The ADC is a sophisticated, high-speed "observer".

Imagine, if you will, standing at the seaside with a ruler, stopwatch, pad and pencil. Now think of measuring the height of the incoming waves with the ruler every time the stopwatch clicks off a second, then writing the measurement and the time down on the pad with your pencil.

This would give you a rough idea of how to recreate the action of the waves at some future time. This is essentially what an ADC does, except that it looks at the sound wave at the rate of 30,000 measurements, or "samples" per second.

The ADC records this information in specific locations in the memory in the form of binary code numbers. The numbers and locations for one sample, which may be up to six seconds long, are called the WAVESAMPLE, Playing the sound back is a matter of reversing the above process. This requires a Digital to Analog Converter (DAC) that takes the digital information and re-assembles the waveshape as voltage information that can be amplified and sent to the speakers.

Digital Recordings as Instruments

If we record a sound at a sampling rate of 30,000 samples per second and then play the sound back at 60,000 samples per second, the note would be one octave higher than the original. By precisely adjusting this playback rate with a keyboard controller, we can begin to create music.

Like everything else, there are a few catches to digital sampling. There's a limit to how far a sampled sound can be raised or lowered in pitch before it begins to sound like a squeak or a thud.

Also, acoustic instruments have different dynamic and harmonic qualities at different pitch levels.

The solution to recreating an instrument is to sample it at different pitch intervals and not raise or lower the pitch of any one sample too far from the pitch of the original wavesample. The Mirage can accommodate up to 8 separate wavesamples per keyboard half, so very accurate reproduction of acoustic instruments is possible with the Mirage;

Catch number two is the sampling time. There are a finite number of locations in the memory, and the greater the number of wavesamples, the less memory is available for each, This reduces the actual time available for each wavesample.

One solution to this problem is a process called LOOPING. Looping is the replaying--again and again without interruption--of a certain part of the wavesample. In practice it's very much like creating a tape loop. A part of the note is cut out and the end is spliced to the beginning, resulting in an unending and uninterrupted sound.

The Mirage's digital circuitry lets you choose the loop start and end pointers electronically, Now you can play through the attack portion of a note, and then loop the sustain portion, giving you a high quality note of infinite duration. The playback envelope parameters can now tailor this looped sound so that it matches the original sound.

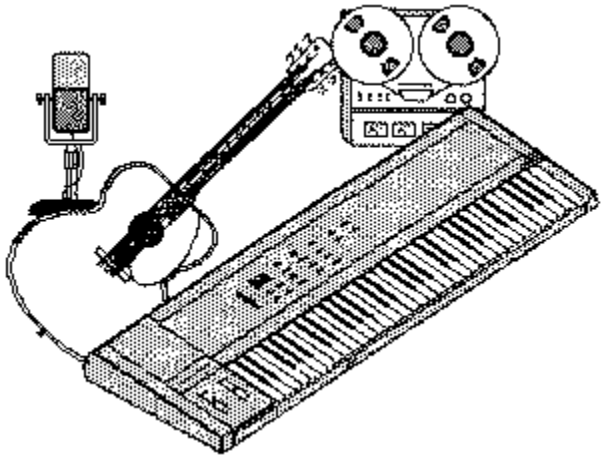
When to call in reinforcements.

There's more to the details of Mirage sampling and programming than we'll address here. A very extensive Advanced Sampler's Guide, along with a special Mirage Advanced Sampling Operating System (MASOS), are available from your authorized Ensoniq dealer. The Advanced Sampler's Guide examines the capabilities of the Mirage in great detail.

When you become familiar with the capabilities of the Mirage, we're sure you'll want to move into the advanced area. At that point, a personal computer will be a great help in showing you exactly what's going on inside the Mirage and how you can best release its musical power.

HOW TO SAMPLE

The basic sampling process is not much more complicated than making a good quality audio tape copy. It involves making the proper connections, setting the right levels, capturing the recording, and checking the results.



The process is controlled by the sampling parameters and gives you a great deal of flexibility. Covered here is the general procedure to follow when sampling.

The flexibility of the Mirage gives you many other options for sampling and manipulating sound. These options, along with additional information and variations to the procedure are contained in the Advanced Sampler's Guide.

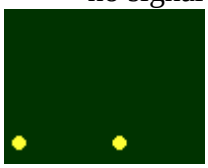
GETTING READY TO SAMPLE

The nature of the sound you will be sampling will have some effect on the results. Unfortunately there are no hard and fast rules governing different techniques for different sounds. As you use the Mirage you will quickly adapt to the procedure and develop your own methods for getting the best results.

As an example, let's use an electric guitar. We can connect the guitar directly to the Mirage input or connect the "preamp out" jack of an amplifier directly to the Mirage. We could mike the speaker cabinet and plug the microphone into the Mirage, or we could run the mike through a mixer and take a line out of the mixer into the Mirage. As you can see, there are many ways to go about getting a sample.

One important thing to remember is this: there is no level control for the audio input of the Mirage. You must adjust the level at the source. For this reason, the best results will always be obtained by sending the Mirage a line level signal (from a mixer, synthesizer, tape deck, etc.) whose volume you can adjust, and using the Mirage's LINE LEVEL INPUT (param 75-on).

TO SET THE RECORD LEVEL:

Do this...	*Here's what's happening...*	*Display will show...*
Select parameter 75 - LINE LEVEL INPUT	This is a switching parameter that will tell the Mirage what type of signal will be coming in. Line level inputs are from preamps, tape decks and mixers. Mic level inputs are from microphones, unamplified electric guitars and other low level sources.	**on** (line input) **oF** (mic input)
Press SAMPLE UPPER or SAMPLE LOWER	You are telling the Mirage which keyboard half you wish the sample to apply to. This will also place the Mirage in the level detect mode so that the strength of the incoming signal can be determined before the sample is made.	
Play the sound to be sampled	Adjust the level of your source or change the distance from the microphone until the top light bar barely flickers, If the top LED lights continuously, this indicates clipping. Reduce the level of the incoming signal.	no signal  threshold low signal peak
Press CANCEL	This will exit the "level detect" mode.	
- OR - Press ENTER, and then play the sound to be sampled	The Mirage will wait until the incoming signal crosses the threshold, and then begin sampling the sound, After about 2 seconds the display will return and you can play back the sample.	**SF** (Sample Finished)

This is the basic procedure you will follow for all sampling. Setting the level is very important. Too low a level will result in a poor quality sample; too high a level will result in clipping (and digital clipping can be **very** nasty), As a rule, you shouldn't hesitate to resample the sound over and over until the recording level seems right.

Also, any sound you sample will be played back through the program presently selected. It is often best to load in the sound data from a blank formatted diskette to provide a template program for your own samples. After you have made a sample you like, you can readjust the program parameters to your liking.

Remember, whenever you are working with wavesamples, or adjusting the programs, always press 0/PROG to verify that you are working on the correct keyboard half. If the correct half is selected U for Upper, or L for Lower), simply press Cancel and proceed. If the wrong half is selected, pressing 0/PROG again will switch to the other keyboard half.

SINGLE WAVESAMPLE WAVETABLES

If you only need to take one wavesample in the lower or upper keyboard half, the sampling parameters are automatically set at the proper values (Param 77-off). No matter what the pitch of the original sound is, the Mirage will play that sound back at key #17(E) on the lower keyboard or key #46(A) on the upper keyboard. You can then use the RELATIVE COARSE TUNING parameter (67) or RELATIVE FINE TUNING parameter (68) to adjust the sample to play back at any pitch you desire.

Do this...	***Here's what's happening...***	***Display will show...***	
Select parameter 77 - USER MULTI-SAMPLING Press OFF	This will set the automatic parameter settings for a single wavesample wavetable.	**oF**	
Press SAMPLE LOWER	You are instructing the Mirage to assign this sample to the lower half of the Mirage memory, Wait until the display goes blank.	**SL** (sample lower) Flashing	
Press ENTER	The Mirage is now waiting for a signal level to cross the sampling threshold before it begins to sample.	Dots lit	

Play the sound	The Mirage is now sampling the sound. While it's sampling you'll see the middle bar and when the sample is completed you'll see...	**SF** (sampling finished)	

MULTIPLE WAVESAMPLE WAVETABLES

Each half of memory can contain up to eight individual wavesamples. When more than one wavesample is used, you must select the location in the memory for each wavesample. The accompanying chart gives some suggestions where to set the beginning and ending parameter values for each wavesample. You can, however, allocate the Mirage's memory in any way you want, which will depend on the amount of memory necessary for different wavesamples.

In order to be able to display all 256 segments, or Pages, in the memory on the two-digit display, a hexadecimal system (base 16 to math buffs) of both numerals and alphabet characters is used. See the note at the bottom of the Memory Chart for an explanation of hexadecimal.

Once you decide how many wavesamples your wavetable will have, setting the parameters will follow the same procedure for each wavesample.

Example: Creating a 2 wavesample wavetable on the lower keyboard half

Do this...	*Here's what's happening...*	*Display will show...*	
Select parameter 77 - USER MULTI-SAMPLING Press ON	This will defeat the automatic parameter on settings for a single wavesample wavetable.	**on**	
Select parameter 27 - INITIAL WAVESAMPLE PRESS or to set VALUE	Except in certain advanced cases, this parameter should always be set to l.	**0.1**	

Select parameter 26 - WAVESAMPLE SELECT PRESS or to set VALUE	There are eight possible wavesamples to select. Select #1.	**0.1**	
Select parameter 60 - SAMPLE START PRESS or to set VALUE	Since this is wavesample #1, it's best to begin at the beginning of the memory.	**0.0**	
Select parameter 61 - SAMPLE END PRESS or to set VALUE	Since there will be two wavesamples in this wavetable, we will give half the memory to each. Looking on the Memory Chart across from "2 wavesamples" you'll find the value 7F.	**7F**	
Select parameter 72 - TOP KEY PRESS or to set VALUE	This will be the highest key assigned to this wavesample. Each keyboard half has 30 keys, so select key 15 for wavesample #l.	**15**	

Press SAMPLE LOWER	You are instructing the Mirage to assign this sample to the lower part of the keyboard.	**SL** (sample lower) Flashing	
Press ENTER	The Mirage is now waiting for a signal to cross the sampling threshold before it begins to sample.	Dots lit	

You're now ready to begin to sample wavesample #l. If you've selected the lower keyboard half and checked the input level, all you'll have to do is play the sound to be sampled.

Wavesample #2 will be entered in the memory in exactly the same way wavesample #1 was with the following changes in parameter values:

Wavesample Select (26)	02
Initial Wavesample (27)	No change
Sample Start (60)	80
Sample End (61)	FF
Top Key (72)	30

Now you can simply press SAMPLE LOWER again and repeat the sampling procedure to record wavesample #2.

SAMPLING PARAMETERS

In order to better understand the sampling process, we recommend that you familiarize yourself with the Sampling Parameters listed in the PARAMETER APPENDIX. Understanding these parameters is your best help in obtaining good samples.

The chart below provides some guidelines for allocating Mirage memory when using multiple wavesamples. Use parameter 26 to select the upper or lower wavesample you want, then adjust

the values for each as shown below. Again, these are guidelines - you can set the values of these parameters to any values you want. To get much deeper into the sampling process, you'll need to consult the Advanced Sampler's Guide, available from your Ensoniq dealer.

Memory / Key Chart

# of Wave-samples	Wave-sample Number	Value of Param 60	Value of Param 61	Top key (Lo) Param 72	Top Key (Up) Param 72	
1	1	00	FF	30	61	
2	1	00	7F	15	46	
	2	80	FF	30	61	
4	1	00	3F	8	39	
	2	40	7F	15	46	
	3	80	BF	23	54	
	4	C0	FF	30	61	
8	1	00	1F	4	35	
	2	20	3F	8	39	
	3	40	5F	12	43	
	4	60	7F	15	46	
	5	80	9F	19	50	
	6	A0	BF	23	54	
	7	C0	DF	27	58	
		8	E0	FF	30	61

HEXADECIMAL NOTATION

The digits 0 through 9 represent themselves. However, the numbers 10 through 15 are represented by letters in the following manner: A=10; b=11; C=12, d=13; E=14; F=15.

SAMPLING TIPS

Here are a few general tips which will help you to make better quality samples:

- **Get it on tape first**. When you have a sound on tape, and you then sample from the tape, you can resample it if your first attempt is unsatisfactory. This allows you to try different record levels, equalization settings, etc., while knowing that the source sound remains exactly the same each time you sample it.
- **Use equalization**. Sometimes what you put into the Mirage isn't exactly what you get out. Other times, there are some funny harmonic components in a sound that sound wrong when transposed up and down. In either case you can correct a great many problems with equalization (a fancy word for tone controls). Put the equalizer in line between the audio source and the Mirage's input, and try different settings while repeatedly resampling the sound. Try boosting the high-mids a little, notching out offending harmonics, or whatever settings make the final sample sound more like your idea of how it should be. Even if you don't have an external equalizer, you can do a lot with the channel EQ on your mixer. Experiment.
- **Resample it**. It can't be stressed enough - the best results can only be obtained by patiently resampling the sound a number of times while trying different record levels, EQ settings, sample rates, filter settings, etc.; not to mention other effects you might want to try - reverb, digital delay, exciters and so on. Once you have a good sample, save it to a formatted diskette; but you should then feel free to sample the sound again with a little more of this or a little less of that.

INTERFACING

The Mirage can be connected to other keyboards and equipment through a system known as MIDI. MIDI, or Musical Instrument Digital Interface is an industry-wide set of computer communication standards that permits MIDI- equipped instruments to "talk" to each other. Some of the benefits of MIDI include the ability to "remote control" more than one instrument from the same keyboard and to drive multiple keyboard setups from a single sequencer.

Before connecting several instruments together you should familiarize yourself with the MIDI codes in the APPENDIX and with the following parameters.

Parameter	Function
81	MIDI OMNI MODE ON/OFF
82	MIDI CHANNEL SELECT
83	MIDI THRU MODE
84	MIDI FUNCTION ENABLE
85	SEQUENCER EXTERNAL CLOCK

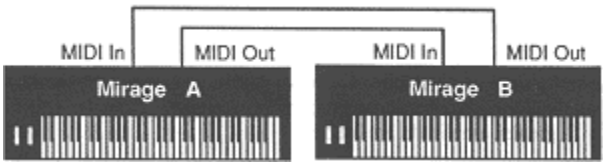
TYPICAL MIDI CONNECTIONS:

This configuration will permit notes played on Mirage A to play on Mirage B. Conversely, notes played on Mirage B will also play on Mirage A.

81/MIDI OMNI MODE-ON
82/MIDI CHANNEL 1...16

81/MIDI OMNI MODE-ON
82/MIDI CHANNEL 1...16

In this configuration, the parameters are set differently, but the result is the same. Since both instruments are transmitting and receiving MIDI data on channel 1, they will both respond to each other. So notes played on Mirage A will also play on Mirage B and notes played on Mirage B will also play on Mirage A. If the channels weren't set the same, the two Mirages would ignore each other



81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 1

81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 1

In this configuration, Mirage A will accept inputs only on channel one, where Mirage B will accept information on all channels. So notes played on Mirage A will also play on Mirage B, but notes played on Mirage B will be ignored by Mirage A.

81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 1

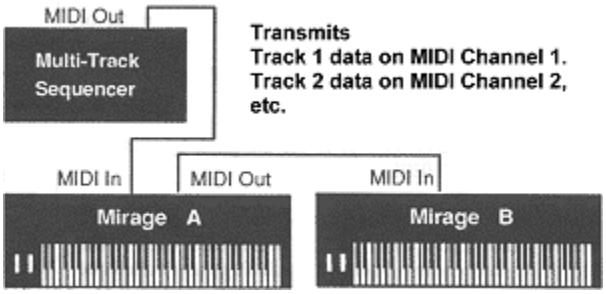
81/MIDI OMNI MODE-ON
82/MIDI CHANNEL - ANY CHANNEL OTHER THAN 1

Mirage sequencers can also be sync'd together via MIDI. A recorded sequence on Mirage A can be sync'd to an altogether different sequence recorded on Mirage B. Note that in this configuration notes played on either Mirage will be ignored by the other since the channels are different. MIDI clocks are transmitted on all channels, so the sequencers will sync.

81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 1
85/EXTERNAL CLOCK - OFF

81/MIDI OMNI MODE-ON
82/MIDI CHANNEL 2
85/EXTERNAL CLOCK - ON

MIDI allows multiple keyboards (or other modules) to be sequenced from multi-track sequencers (such as the Ensoniq ESQ-1) in such a way that different sequencer tracks drive different keyboards. In this configuration, track 1 of the sequencer will only play on Mirage A and track 2 of the sequencer will only play on Mirage B.



81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 1
83/MIDI THRU-ON

81/MIDI OMNI MODE-OFF
82/MIDI CHANNEL 2

Other MIDI Information

The MIDI standard allows for a wide range of communication between instruments (not to mention computers) of all different makes and models. It's important to understand that any MIDI instrument can communicate with any other. Though each manufacturer does reserve certain special codes (called System Exclusive Messages) for those messages specific to its

instruments, all the important performance instructions - key down, key up, velocity, pitch bend, Mod wheel, sequencer control functions, etc. - are sent and understood by all MIDI instruments, regardless of the manufacturer.

In addition to notes played and sync information, the Mirage will also send and receive Program Changes (which can be used to remotely instruct the Mirage to load a sound from disk, or to change Upper and/or Lower programs). The Mirage can be set to respond to Pressure (After Touch) or a Breath Controller when played from an instrument that has them. There is also a LOCAL ON/OFF control (param. 30) which allows you to turn off the Mirage's internal voices and only send what you play out MIDI, It's a good idea to familiarize yourself with the descriptions in the PARAMETER APPENDIX in order to take full advantage of these capabilities.

For more information about the MIDI standard, contact the International MIDI Association, 11857 Hartsook St., North Hollywood, CA 91607.

MASOS

Since the Mirage is essentially a computer, how it functions (including its MIDI implementation) depends entirely on the operating system (O.S.) that is loaded into its memory from diskette each time you turn it on. The standard Operating System (which is the one found on the three sound disks that came with your Mirage) is optimized for performance - sequencing, receiving program changes and After Touch, etc. There is another operating system, called MASOS (Mirage Advanced Sampling Operating System), which gives up these features in order to implement others, such as the ability to send sound data via MIDI to computers, and to perform complex data manipulations such as scaling, reversing, and adding sounds together digitally. MASOS is included with the Advanced Sampler's Guide, and its MIDI implementation is covered there.

GLOSSARY

Amplitude	Expressed as sound pressure or voltage, amplitude is the measured amount of a signal. Sounds with greater amplitude are louder.
Attack	The first part of a note. In the Mirage it is the rate at which the amplitude of the sound rises from zero to the PEAK level, and is adjustable from instantaneous to very gradual.
Attack Velocity	The Mirage gives you the option of controlling the steepness of the attack curve through keyboard velocity. Increased key velocity will increase the rate of the attack.
Bend	To gradually raise or lower the pitch by using the PITCH BEND WHEEL.
Boundary	The sampling parameters divide the Mirage memory into 256 Pages, of 256 SAMPLES each. The beginning and ending points of each Page are called the boundaries.
Chorusing	A sound richening effect that simulates the sounds of several voices when one key is played. The Mirage allows you 'to shift the pitch of one of the two oscillators assigned to each voice to achieve this effect.
Clock	A timing control device used to sync digitally controlled units. Clock pulses are used to control the Mirage sequencer.
Coarse Tune	A parameter used to make large and rapid tuning changes.
Cutoff Frequency	The frequency point at which a filter begins to attenuate an audio signal.
Dead Band	The area of travel near the center of rotation of the PITCH BEND WHEEL where there is no effect on the sound so that it can be more easily returned to its mid position.
Decay	In the Mirage envelope, it is the rate at which the amplitude of a sound (or cutoff frequency of a filter) falls from the PEAK level to the SUSTAIN level.
Default	A value or condition that the Mirage automatically sets itself to. When the Mirage is first turned on and a diskette is inserted into the disk drive, Sound #1 is automatically loaded to both keyboard halves with program #1 being current. The Mirage has many default values for programming, sampling and sequencing. While these values are automatic, they can be changed at any time you desire.
Detune	In normal playing, the Mirage uses two oscillators per key. By using the detune parameter (33), one of the oscillators can be tuned slightly off pitch from the other. Slight pitch changes will result in a CHORUSING effect.
Digital	In audio, the digital system uses information in the form of binary numbers rather than waveforms and voltages when recording, processing and playing back sound. The digital playback is processed through a digital- to-analog converter where it is changed into voltage values that can then be treated like any other analog signal.
Digital Oscillator	A waveform generator where the output is a series of numbers rather than a voltage. Digital oscillators can generate complex waveforms with much more

	accuracy than analog oscillators.
Digital Sampling	A system of sound recording where an analog sound is converted into digital information and stored in computer memory or on a disk. In the Mirage, sampled sounds are given pitch control via the keyboard permitting any recorded sound to be played back as music.
Digital Sequencer	A sequencer that records and plays back notes based on information about key strikes, key velocity, and pitch and mod wheel positions rather than recording sound output.
Envelope	A term used to describe the amplitude contour or filter cutoff frequency contour as a function of time. Acoustic sounds have natural envelopes as vibrations attenuate over time. Electronic instruments have envelope generators to create this effect.
fc	The symbol for cutoff frequency, or that frequency at which the sound begins to be attenuated.
Fine Tune	A control used to make small adjustment in pitch. The Mirage's fine tune parameter permits pitch changes as small as 1/20 semitone.
Formatted Diskette	A Mirage diskette that contains a framework for sound information, but no actual information. Used to store sampled sounds, programs and sequences.
Hexadecimal	A form of mathematical notation called "base 16". As used in the Mirage display, it permits the display of all 256 "pages" of wavetable storage using only two digits in the display. Numbers 0 through 9 are represented by themselves; the numbers 10 through 15 are represented by "A" through "F".
Input	A signal entering an instrument. Also the point at which it enters.
Interface	Literally, the place where any two things come together. In musicianspeak it is commonly understood to be the linking of two pieces of electronic equipment together.
Keyboard	A controller used to give pitch and dynamic control of a musical instrument to the player.
Keyboard Tracking	Assigning a different value to a parameter based on which key of the keyboard is depressed. For example, the cutoff frequency of a filter can move up as higher keys are played.
LFO	Low frequency oscillator. These oscillators operate in the sub-audio range and control the frequency of effects such as vibrato.
Line Level	An audio signal whose strength is at least 800mV.
Load	In the Mirage, a term used to describe the transfer of data from diskette to the internal memory.
Loop	A term used to describe the connecting of the end of a signal or sequence to the beginning point of some intermediate point along its duration. As it applies to a sequencer, it means that the sequence will start over immediately after it finishes. As it applies to sampling, it means creating a continuous sound by connecting two points in the wavesample.
Lowpass Filter	A filter that attenuates the frequencies above the cutoff frequency.

Memory	The sum total of locations where information can be stored. The Mirage has 64K (65,536 locations) of memory for each keyboard half. The sampling parameters divide the memory into 256 PAGES of 256 SAMPLES each. The beginning and ending points of each PAGE are called BOUNDARIES.
Mic Level	Audio signals with a strength between 50 and 100 mV.
MIDI	Musical Instrument Digital Interface.
Mix Mode	In the Mirage, a parameter that assigns two consecutive wavesamples to each key on the keyboard. The balance between the two sounds can be controlled by a balance parameter, the velocity sensitivity of the keyboard or the modulation wheel.
Modulation	The process of introducing a periodic alteration to a sound source such as vibrato, so as to change the character of the audio signal.
Monophonic Mode	In the Mirage, a control mode that assigns one voice to each half of the keyboard. If a second key is depressed while the first key is still down the voice is "stolen" from the first key, but the envelope is not re-triggered. Useful for duplicating the sound of monophonic instruments such as saxophone.
Omni Mode	A MDI operational mode where an instrument responds to information received over any of MIDI's 16 channels.
Oscillator	A device that creates a repeating electrical wave. Mirage oscillators are digital oscillators that use a wavetable based on actual acoustic sounds rather than basic waves.
Parameter	Any changeable setting, switch or command of the Mirage is called a parameter. The Mirage uses a multi-function panel through which parameters can be selected and controlled. Tuning, filter frequency cutoff, sample time, velocity sensitivity and LFO frequency are all examples of parameters.
Pitch Bend	To change the pitch in a continuous manner using the pitch bend wheel.
Poly Mode	A MIDI operating mode where an instrument responds to information received only on a specific MIDI channel.
Polyphonic	Capable of producing more than one pitch or voice simultaneously. The Mirage can play up to eight different voices at the same time.
Program	A set of playback parameter values applied to a particular wavesample that results in a particular sound. The Mirage has four programs for each sound.
Q	Filter resonance. It is possible to adjust the lowpass filter in the Mirage to introduce a narrow resonant peak just before rolloff occurs. The resultant sound shows a noticeable emphasis of a narrow frequency band.
Release	The final portion of an envelope that begins when the key is lifted. It is an exponential rate that drops the amplitude or filter fc from the sustain level to zero in the case of amplitude or the original fc setting in the case of the filter.
Re1ease Velocity	The speed with which the key is lifted. Release velocity can be used to control the release rate, with high velocities shortening the release and low velocities extending the release.
Resonance	See Q.
Rolloff Slope	The sharpness of the cutoff frequency expressed in dB per octave. The higher

	the ratio number, the sharper the attenuation. The Mirage filters have a rolloff slope of 24dB per octave.
Sample	In the Mirage memory, each location is referred to as a sample, 256 samples make up one Page.
Sampling Rate	The number of times per second that a digital record is made of an audio wave form. The Mirage's default sample rate is 30,000 samples per second, though that can be varied.
Save	The process of transferring information from the internal memory of the Mirage to a Formatted Diskette for permanent storage. The opposite of loading.
Page	The Mirage memory has 64K memory locations divided into 256 Pages of 256 SAMPLES each. The beginning and ending points of each page are called BOUNDARIES.
Sequence	A set of keystroke commands stored in a sequencer.
Sequence Loop	A function of a sequencer where the recorded sequence is played over and over until instructed to stop.
Sound	In the Mirage, a sound is defined as a WAVETABLE (comprised of up to 8 WAVESAMPLES) plus a PROGRAM (the collection of all the program parameter values).
Sound Diskettes	Ensoniq makes available preprogrammed sampled sounds on mini-diskettes. Each of these Sound Diskettes contains three distinct sampled sounds, with each sound having four programs.
Split Keyboard	The Mirage features a split keyboard. The keyboard is divided into two sections (usually, 31 keys lower, 30 keys upper). Different sounds or different programs of the same sound can be loaded into each keyboard half.
Sustain	The amplitude or filter level held from the end of the decay slope to key release.
Sync	Connecting two or more units together so that clock pulses permit them to play together in a synchronized fashion. The most common sync connections involve sequencers and drum machines connected to keyboards.
Value	Rather than have knobs, sliders and switches, the Mirage uses a system of parameters and values to change and modify sounds. Expressed in numbers (either decimal or hexadecimal), values represent amplitudes, frequencies, balances and other conditions, depending on the parameter selected.
Velocity Sensitivity	A system of sensors that can determine how hard and fast a key is played. This information can be applied to control amplitude, filter frequency, envelope functions and oscillator balance.
Voice	A complete sound controlled by a single key. The Mirage features eight distinct voices with two oscillators for each voice.
Volatile Memory	An internal memory that will not retain any information if the power to the unit is turned off. The Mirage has a volatile memory, so we recommend that you save sounds and programs you create to diskette as soon as your sampling or programming session is completed.
Waveform	The shape of a sound wave shown as a function of amplitude and time. Synthesizer oscillators generate simple waveforms (sine, triangle, etc.) and

	combine them to create sound. Digital sampling keyboards such as the Mirage generate complex waveforms based on actual sounds that have been recorded (sampled) into memory.
Wavesample	A waveform that has been sampled into the Mirage memory. Once in memory, the keyboard controls the pitch of the wavesample. The Mirage can accommodate up to eight separate wavesamples per keyboard half. Since acoustic instruments change dynamic and harmonic character with pitch, the Mirage is capable of very accurate reproduction.
Wavesample Interval	The number of keys on the keyboard assigned to each wavesample.
Wavetable	The sum of all the wavesamples on a keyboard half.

PARAMETERS

Program Selects (01, 02, 03, 04)

These parameters are used to select one of the four programs assigned to each sound on each keyboard half. You must first press the 0/PROG button which will display the current program number and the keyboard half it is assigned to. Pressing the 0/PROG button again will display the program number of the other keyboard half. When sounds are loaded, Program 1 is automatically selected.

11/Save Lower Keyboard Sound (SL)
12/Save Upper Keyboard Sound (SU)
13/Save Both Keyboard Sounds (SA)

Command parameters that will tell the Mirage that you wish to save the current keyboard sound on diskette. The saving process will require you to press 1, 2 or 3 on the SELECT keypad to indicate the location on the diskette that you wish the sound transferred to. Pressing ENTER will initiate the saving process. Pressing CANCEL will abort the procedure and return the Mirage to its previous status, with the SAVE command parameter selected.

14/Save Configuration Parameters (SP)

This command parameter will permit you to save your own configuration parameters in place of the default values. The values saved on diskette will be those of parameter #'s 21 through 25, 30, 73 through 79, 81 through 89 and 91 and 92. You can change the values of any of the parameters listed above on a diskette. The next time you turn the Mirage on, "boot" it from that diskette (put that diskette in the drive). The Mirage will take its operating system from the diskette, with the modified parameter values in place. This way you can make customized operating systems for different occasions.

15/Copy Program to Lower (CL)
16/Copy Program to Upper (cc)

These are command parameters that will tell the Mirage ST that you wish to copy the current program parameter values into another program location. This will allow you to duplicate a program you've personally created, or one of the factory programs, into another program location on either the upper or lower keyboard half. It will also permit you to apply a program (from a lower sound, for example) to another (upper) sound.

21/Master Tune (00-99)

The MASTER TUNE will automatically set itself to A440 (VALUE 50). It is adjustable over a five semitone range in increments of 1/20 semitone.

22/Pitch Bend Range (00-12)

The PITCH BEND RANGE will automatically set itself (default) to a whole step (VALUE 2). It is adjustable over a one octave range in increments of one semitone.

23/Keyboard Velocity Sensitivity (00-63)

The KEYBOARD VELOCITY SENSITIVITY will automatically set itself (default) to the touch of the average player (VALUE 30). Players with a heavier than average touch should use the lower values and players with a light touch should use the higher values.

24/Keyboard Balance (00-63)

The KEYBOARD BALANCE will automatically set equal levels for the upper and lower halves of the keyboard (VALUE 32). The parameter works very much like a pan pot with the higher numbers favoring the upper keyboard and lower numbers favoring the lower keyboard.

25/Upper/Lower Program Link

A switching parameter that will allow you to connect the 0/PROG button on both keyboard halves simultaneously. With this parameter ON, the program selected on one keyboard half will also be selected on the other keyboard half. When OFF, you will be able to choose different programs for the upper and lower halves.

28/Mix Mode (ON-OFF)

Each Mirage key is assigned two oscillators. When this switching parameter is OFF, the two oscillators will use the same wavesample. When this switch is ON, the oscillators will use consecutive wavesamples - one to each oscillator. For the MIX MODE to work, odd numbered wavesamples (1, 3, 5, 7) should be from a different sound source than the even numbered wavesamples. The balance between the two oscillators can be controlled by parameters 34 and 35. One use of the MIX MODE is to have a soft sound on the odd wavesamples and a hard sound

on the even wavesamples. By using key velocity to control the balance (PARAM 35), a soft sound will be heard when keys are depressed slowly and a hard sound will be heard when keys are depressed firmly.

29/Monophonic Mode (ON-OFF)

A switching parameter to choose between polyphonic keyboard and monophonic keyboard operation. With the switch OFF, the Mirage will play in its usual eight-voice polyphonic splendor. With the switch ON, one voice will be assigned to each keyboard half. If a key is played while another is still down, the voice will be "stolen" from the first key, but the envelope will not be re- triggered.

30/Local ON/OFF (ON-OFF)

The Mirage keyboard can be set to transmit out MIDI information without playing sounds itself. When Parameter 30 is set ON, the Mirage functions as normal. When set to OFF, the Mirage will not sound voices when played from the keyboard, but will send whatever you play out MIDI. The Mirage will still sound notes which are coming in MIDI. This is a useful function when using the Mirage in a multiple keyboard set-up or when using it with external sequencers.

31/LFO Speed (00-99)

The LOW FREQUENCY OSCILLATOR SPEED parameter will change the frequency of the LFO. It is adjustable from .5 Hz (VALUE 0) to 40 Hz (VALUE 99). The LFO affects pitch only.

32/LFO Depth (00-99)

The LOW FREQUENCY OSCILLATOR DEPTH parameter controls the amplitude of the LFO. Higher values will result in greater LFO depth (more vibrato). A value of 0 will assign the LFO depth to the Mod Wheel.

33/D.O. Detune (00-99)

The DIGITAL OSCILLATOR DETUNE parameter controls the frequency difference between two oscillators used on the same key. It will cause the second oscillator to play sharp in small increments. To hear the effect as chorusing, set param. 34 to a middle value, such as 32.

34/D.O. Balance (00-63)

The DIGITAL OSCILLATOR BALANCE controls the relative volume level of the two oscillators in the MIX MODE (param, 28) or for chorusing. A value of 0 results in only Oscillator 1 playing the sound; with a value of 63 only Oscillator 2 will play. A value of 32 results in an even mix of the two oscillators.

35/D.O. Balance vs (00-31)

The VELOCITY SENSITIVE BALANCE parameter makes the digital oscillator balance dependent on key velocity. A soft touch will yield the mix set by param 34, and a hard touch will favor oscillator 2. The D.O. BALANCE (param. 34) will set the initial balance for a soft touch. Parameter 35 controls how much the balance changes with velocity, with one exception. When the value is '0' the balance between oscillators is controlled by the MODULATION WHEEL instead. Since each oscillator can play a different wavesample, it is possible to mix between two totally different sounds.

36/Filter Fc (00-99)

The FILTER CUTOFF FREQUENCY parameter adjusts the initial cutoff frequency of the low pass filter, The filter is adjustable from 50 Hz (VALUE 0) TO 15KHz (VALUE 99) and features a 24 db/octave rolloff slope. The effects of the filter envelope, and the filter keyboard tracking are added to the level set here.

37/Filter Q (00-40)

The FILTER RESONANCE (Q) controls the amplitude of the resonant peak of the filter. It is adjustable from no peak (VALUE 0) to just below oscillation (VALUE 40).

38/Filter Tracking (00-04)

The FILTER KEYBOARD TRACKING parameter allows the note played on the keyboard to determine the cutoff frequency of the filter - lower notes will have a lower cutoff, higher notes a higher cutoff. It is adjustable from no tracking (VALUE 0) to one octave in filter cutoff per octave on keyboard (VALUE 4).

ENVELOPE PARAMETERS

The Mirage offers you a wide range of control over the amplitude and filter envelopes of a sound. In addition to being able to create fixed envelopes, you can use the keyboard velocity sensitivity feature to control any or all of the parameters of an envelope. Note that many of the envelope parameters are particularly dependent on the fixed envelope parameters.

Filter Envelope Parameters:

40/Filter Attack (00-31)

The FILTER ATTACK parameter controls the rate at which the filter frequency will increase from the initial CUTOFF FREQUENCY (param. 36) to the peak frequency. It is adjustable from instantaneous (VALUE 0) to 30 seconds (VALUE 31). Note that the peak level has no effect on the rate of the attack.

41/Filter Peak (00-31)

Controls the maximum cutoff frequency the filter will reach at the top of the attack slope. It is adjustable from zero (VALUE 0) to a maximum of 15KHz (VALUE 31). Note that the peak level has no effect on the rate of the attack.

42/Filter Decay (00-31)

Controls the rate at which the filter cutoff frequency will descend from the PEAK value to the SUSTAIN value. At VALUE 31, it will take 30 seconds to reach the sustain level. At VALUE 0, it will drop instantly to the SUSTAIN level.

43/Filter Sustain (00-31)

Controls the cutoff frequency that the filter will hold as long as the key is depressed. At VALUE 0 it will be the same as the initial cutoff frequency (param. 36). At VALUE 31 it will be maximum.

44/Filter Release (00-31)

Controls the rate at which the filter frequency will descend from the sustain value to the initial cutoff frequency (param. 36) after the key is released. At VALUE 31 it will take 30 seconds to reach the minimum level and at VALUE 0 it will release instantly.

45/Filter Attack vs (00-31)

The VELOCITYSENSITIVEFILTERATTACK parameter makes the filter attack rate dependent on key velocity. At VALUE 0, key velocity will not effect the attack rate. Increasing the value will make the attack rate more sensitive to keyboard velocity (increased key velocity will speed up the attack rate).

46/Filter Peak vs (00-31)

The VELOCITY SENSISTIVE FILTER PEAK parameter makes the maximum filter frequency peak level dependent on the key velocity. At value 0, key velocity will not affect the peak. Increasing the value will make the peak level more sensitive to key velocity (increased key velocity will raise the peak frequency).

47/Kybrd Decay Scaling of Filter (00-31)

A parameter that makes the decay rate of the filter envelope dependent on the location of the key. This permits the filter to have a longer decay rate on lower notes than on higher notes. At VALUE 0, it will have no effect on the decay setting. Increasing the value number will shorten the decay time of higher notes.

48/Filter Sustain vs (00-31)

The VELOCITY SENSITIVE FILTER SUS- TAIN parameter makes the sustain level dependent on key velocity. At value 0, key velocity will not effect the sustain frequency. Increasing the value will make the filter sustain level more sensitive to key velocity (increased key velocity will raise the sustain frequency).

49/Filter Release vs (00-31)

The VELOCITY SENSITIVE FILTER RELEASE parameter makes the release rate of the filter frequency dependent on key-up velocity (how fast you let up the key). Increasing the value will make the release rate more sensitive to key-up velocity (increased key-up velocity will shorten the release rate.)

Amplitude Envelope Parameters:

50/Attack Rate (00-31)

Controls the rate at which the volume will rise to the peak when a key is played. At VALUE 0 it is instant and at VALUE 31 the amplitude will take 30 seconds to reach the peak.

51/Peak Level (00-31)

Controls the maximum amplitude that will be reached at the top of the attack slope. It is adjustable from no sound at VALUE 0 to maximum output at VALUE 31.

52/Decay Rate (00-31)

Controls the rate at which the amplitude descends from the peak level to the sustain level. At VALUE 31 it will take 30 seconds for the amplitude to fall to the sustain level. At VALUE 0 it will drop instantly to the SUSTAIN level.

53/Sustain Level (00-31)

Sets the amplitude level that the note will play at between the end of the decay segment and the time you release the key. At VALUE 0 there will be no output after the decay and at VALUE 31 the sustain will be at the maximum level.

54/Release Rate (00-31)

Controls the rate at which the amplitude descends to 0 after the key is released. At VALUE 31 it will take 30 seconds to reach 0 and at VALUE 0 the amplitude will fall instantly to 0.

55/Attack vs (00-31)

Makes the ATTACK RATE dependent on key velocity. At VALUE 0 key velocity will not effect the attack rate. Increasing the value will make the attack rate more sensitive to keyboard velocity (increased key velocity will shorten the attack rate).

56/Peak Level vs (00-31)

The VELOCITY SENSITIVE PEAK LEVEL parameter makes the maximum peak level dependent on key velocity. At VALUE 0, key velocity will not effect the peak level. Increasing the value will make the peak level more sensitive to key velocity (increased velocity will raise the peak level).

57/Keyboard Decay Scaling (00-31)

A parameter that makes the decay rate of the amplitude envelope dependent on the location of the key. This permits the note to have a longer decay on lower notes than on higher notes. At VALUE 0 it will have no effect on the decay setting. Increasing the value will shorten the decay time of higher notes.

58/Sustain Level vs (00-31)

The VELOCITY SENSITIVE SUSTAIN LEVEL parameter makes the sustain level dependent on key velocity. At VALUE 0, key velocity will have no effect on sustain level. Increasing the value will make the sustain level more sensitive to key velocity (increased velocity will raise the sustain level).

59/Release Rate vs (00-31)

The VELOCITY SENSITIVE RELEASE RATE parameter makes the release rate dependent on release velocity. At VALUE 0 velocity will have no effect on release rate. Increasing the value will make the release rate more sensitive to key- up velocity (increased key-up velocity will shorten the release rate).

SAMPLING PARAMETERS

The sampling parameters (60 through 77) will control the entry and manipulation of the wavesample selected by parameter 26. Since Mirage sampling is a computer driven function, very specific directions must be given to the Mirage to obtain the best samples.

Sampling is an art as much as it is a science. At Ensoniq, many hours of effort and a great deal of care go into creating the sounds provided on Ensoniq Sound Diskettes. Don't be disappointed if your initial samples aren't quite as good. The Advanced Sampler's Guide, available from your Ensoniq dealer, combined with your growing experience, will help you get better sounds.

26/Wavesample Select (1-8)

A sampling parameter that will select one of eight possible wavesamples for each keyboard half. Once selected, this wavesample will be controlled by parameters 60 through 75 until the next wavesample is selected, or the active keyboard half is changed. Before beginning to work with a wavesample, press 0/Prog to make sure the proper half (upper or lower) is selected.

27/Initial Wavesample (1-8)

This parameter will select the first wavesample number used by the lowest key of a keyboard half. Except in certain advanced sampling situations, this parameter is usually set to "1". It can be used to make each program of a keyboard half play an entirely different sound.

60/Wavesample Start (00-FF)

Sampling parameter used to select the starting segment in the Mirage memory for the current wavesample. If the wavesample is #1, the start value will usually be 00. Subsequent wavesamples (2,3, etc.,) will usually start one page (one digit) after the end of the previous wavesample, though any of the eight wavesamples can occupy any part of the memory. The WAVESAMPLE START values are in hexadecimal (00-FF).

61/Wavesample End (00-FF)

Sampling parameter used to select the ending page in the Mirage memory for the current wavesample. The value for each wavesample will be determined by the number of wavesamples in the wavetable. The value table in the sampling section will give you suggested ending and starting values.

LOOPING

Rather than assign valuable memory space to a portion of a wavesample that simply repeats, the Mirage uses a technique called "looping" to extend the decay and sustain portions of the sound.

Most acoustic sounds stabilize in character rather quickly. In less than 1/2 second, an acoustic guitar note settles down to something resembling a sine wave. By looping the last portion of a one second acoustic guitar sample, a very true guitar sound with long sustain can be created while using a minimum amount of memory.

62/Loop Start (00-FF)

A sampling parameter used to select the page in memory at which the looping process will begin. To create an effective loop, the LOOP START should be a point sometime after the initial attack portion of the wavesample has been completed. Like other starting and ending parameters, LOOP START is a memory page number expressed in hexadecimal.

63/Loop End (00-FF)

A sampling parameter used to select the page where a loop will end and recycle to connect with the LOOP START. To optimize the use of memory, the LOOP END should be the last page before the WAVESAMPLE END. LOOP END is a page number expressed in hexadecimal.

64/Loop End Fine Adjust (00-FF)

This parameter will allow you to adjust the LOOP END in individual samples within the chosen loop end page. This fine adjustment will help you match the loop end to the loop start as smoothly as possible. (See MEMORY in GLOSSARY).

65/Loop Switch (On-Off)

Turns the looping function on and off. When OFF, the wavesample will play back from beginning to end and then stop. When ON, the wavesample will play from beginning to LOOP END and then continue playing immediately from LOOP START, playing the loop segment over and over as long as the key is depressed. Note that amplitude envelope parameters will control the decay, sustain and release functions of the note.

66/Wavesample Rotate

This parameter will "move" or "rotate" the current wavesample within the Mirage memory one sample at a time. It is used to eliminate "dead space" at the beginning of a wavesample or to align an appropriate LOOP START point with a segment boundary. Pressing the On/Up button will move the entire wavesample one sample to the right in memory, Pressing the Off/Down button will move the wavesample one sample to the left. This parameter is called ROTATE because rather than becoming "lost", values at the wavesample boundary will shift to the opposite end of the wavesample as they are moved. (MASOS, the Mirage Advanced Sampling Operating System, which is available with the Advanced Sampler's guide from your Ensoniq dealer, implements a much more elaborate set of parameters for manipulating wavesamples than the standard O.S. described here.)

67/Relative Tuning - Coarse (00-07)

Alters the pitch of the current wavesample in octave increments.

68/Relative Tuning - Fine (00-FF)

Alters the pitch of the current wavesample in 1/20 semitone increments. There are 256 increments expressed in hexadecimal.

69/Relative Amplitude (00-63)

Adjusts the amplitude of the current wavesample only. This allows you to match the volume levels of different wavesamples.

70/Relative Filter Frequency (00-99)

Adjusts the cutoff frequency of the filter for the current wavesample, relative to the other wavesamples in the wavetable.

71/Maximum Filter Frequency (00-99)

Sets the upper limit of the cutoff frequency for the current wavesample, regardless of any other filter value (program, envelope, velocity).

72/Top Key (01-61)

Selects the highest key that will use the current wavesample. The TOP KEY values will determine how many keys will use the wavesample. The highest TOP KEY of the lower keyboard will determine the split point.

73/Sample Time Adjust (30-99)

This adjusts the rate at which the Mirage will sample. It is expressed in time between samples, however, rather than rate. This parameter sets the time, in microseconds, between individual samples. Combined with the SAMPLE START and SAMPLE END parameters, it will determine the duration of the wavesample. The value is expressed in microseconds with VALUE 34 corresponding to the default sample rate of 29kHz and VALUE 99 corresponding to the minimum sample rate of 10kHz. A higher number will yield a longer sample time, but with a loss of audio quality.

74/Input Filter Frequency (00-99)

Filter cutoff frequency adjustment that will determine the maximum frequency that the Mirage will allow through to the input when sampling. It is adjustable from 50Hz at VALUE 0 to 15kHz at VALUE 99.

75/Line Level Input (On -Off)

Switching parameter to match the Mirage input to the sound source to be sampled in the current wavesample. At VALUE OFF the input will accept mic level signals. At VALUE ON the input will accept line level inputs. The best quality samples will always be obtained by setting this parameter ON, and feeding the Mirage a line level signal from a mixer.

76/Sampling Threshold (00-63)

Adjusts the threshold level which the input signal must cross before the Mirage will begin sampling. Pressing the SAMPLE UPPER or SAMPLE LOWER button will put the Mirage in the "level detect" mode. Playing the sound to be sampled should light the middle bar in the display. If the middle bar does not light, pressing CANCEL and then lowering the value number of this parameter will lower the sampling threshold. After ENTER has been pressed, the first signal above this threshold will automatically begin the sampling process. If this parameter is set to 0, sampling will begin as soon as you press ENTER.

77/User Multisampling (On-Off)

Switching parameter to choose between user- selected sampling parameters and Mirage default values. If this parameter is set to OFF, when sampling is initiated, the Mirage will automatically

set up all the parameters necessary to create a wavetable made up of a single wavesample. When you want more than one wavesample to make up a wavetable, you will have to set the sampling parameters on your own, after setting this switch to ON.

MIDI PARAMETERS

78/LFO Modulator Source (0-9)

The LFO depth can be modulated by external controllers such as After Touch and Breath Controller when the Mirage is played from another keyboard via MIDI. The default value is 1, which selects the Modulation wheel. To select an external controller for LFO depth, set the value of this parameter to the appropriate value, Possible values are:

Controller #	Controller
0	No External Controller
1	Modulation Wheel
2	Breath Controller
4	Foot Pedal Controller
6	Data Entry Slider
7	Volume Pedal
8	After Touch (Channel)
9	After Touch (Polyphonic)

79/Mix Modulator Source (0-9)

The MIX between the two oscillators (for chorusing or mixing between two samples in Mix Mode) can also be controlled by external controllers when the Mirage is played from another keyboard via MIDI. Possible values are the same as for Parameter 78 above. Note: To use an external controller for MIX Modulation, you must also set the value of parameter 32 on the Mirage to 0.

80/After Touch Modulation depth (0-63)

This controls the depth or amount by which After Touch will affect the MIX or LFO Depth when After Touch has been selected as an external controller at parameter 78 or 79. Unless one of those parameters is assigned a value of 8 or 9, this parameter will have no effect.

8l/MIDI Omni Mode/On-Off (On-Off)

Switch parameter to choose between MIDI Omni and Poly modes of operation, When the switch is ON, the Mirage will operate in the MIDI Omni Mode. When the switch is OFF, the Mirage will operate in the MIDI Poly Mode. In the Omni Mode, the Mirage wi11 receive MIDI data on all 16 MIDI channels. In the Poly Mode, the Mirage will receive MIDI data on only the channel selected by param. 82. It will always transmit MIDI information only on the channel selected by param. 82.

82/MIDI Channel Select (01-16)

In the MIDI Poly Mode, you must select one of 16 MIDI channels on which to receive MIDI data. When a channel is selected, the Mirage will recognize only data received on only that channel. Any MIDI data received on any other channel will be ignored.

83/MIDI Thru Mode (On-Off)

Switching parameter to determine whether or not the Mirage will "pass along" MIDI data it receives. When ON, the Mirage will echo all MIDI data it receives regardless of channel. When OFF, the Mirage will not echo any data it receives, except clocks, but will send data it creates. In short, when switched ON, this parameter turns the Mirage's MIDI Out jack into a MIDI Thru jack.

84/MIDI FUNCTION ENABLE (0-3)

Selects which types of MIDI information will be sent and received by the Mirage. With this parameter you can instruct the Mirage to send and receive only key information, key and controller information, or key, controller and program change information. This last combination, which is the default value (VALUE 2) allows external instruments and sequencers to send LOAD instructions and Program changes to the Mirage (see the charts). The parameter has four possible settings:

Value

0 Only MIDI key information is transmitted or received.

1 Key information and controller information are both transmitted and received

2 Same as Value 1 with the addition that program changes are both transmitted and received

3 Same as Value 2 with the addition that to remotely change programs on the Mirage you must also press (+/Yes/Inc./Up Arrow) button on instruments which have such a button, such as the Ensoniq ESQ-1 synthesizer. This setting allows you to change sounds on your controller instrument without changing sounds on your Mirage.

SEQUENCER PARAMETERS

85/External Sequencer Clock (On-Off)

To connect the Mirage sequencer with the MIDI clock of an external unit such as a drum machine or other sequencer.
On = External Clock Off = Internal Clock

87/Internal Clock Rate (00-99)

Changing the internal clock rate will speed up or slow down the playback of a recorded sequence without changing the pitch of the notes. The real time recording speed is always "48" on the parameter value. Increasing the value number will increase the speed up to twice the original rate.

88/Sequencer Loop Switch (On-Off)

Tells the sequencer whether to play a recorded sequence once or to keep repeating it indefinitely. ON - Sequence will keep playing until Cancel is pressed. OFF - Sequence will play through once then stop automatically.

89/Sustain Pedal/Footswitch Select (On-Off)

Changes the function of the footswitch between sustain pedal and remote sequencer switch, ON - In the record function, the footswitch operates the same as the sequencer PLAY switch. In the play function it operates as a remote START/STOP switch. In neither case does it disable the PLAY button. OFF - As a sustain pedal the switch holds the sustain value of the notes played - same as keeping keys depressed.

98/Disk Error Code (01-08)

This parameter will display information about problems that may be occurring in the disk system, The value of this parameter corresponds to error messages or codes which will often appear automatically when you ask the Mirage to do something that is not possible or reflects a problem with the disk drive or diskettes themselves.

Disk Error Codes:

01	dE	Disk Drive Error	This usually indicates a mechanical problem in the drive or diskette.
02-05	nF	Not Found	The information you have requested is not in the requested location on the diskette.
06	ud	Unformatted Disk	The diskette cannot be used because it is not formatted for the Mirage.

07	nd No Diskette	Mirage can't save or load because there is no diskette in the drive.
08	Pd Protected Disk	Information cannot be saved on the current diskette because the write- protect tab is set.

99/Disk Controller Status Code

This parameter is used by service personnel to diagnose disk drive related problems should they occur.

97/Software Version Number

The "value" of this parameter is the version number of the software currently loaded into the Mirage. This parameter is your way of determining the exact software you have booted up with, should there be any doubt.

MIDI Program Change Chart

Shown below are the program change values that will cause the Mirage to load sounds or change upper or lower programs. Consult the Owner's Manual of your particular MIDI controller for the proper program transmit number. Following are two tables - the first for the Ensoniq ESQ-1, the DX - 7 and any other instruments which begin program numbers at #1, and the next showing the true MIDI Program Numbers, which begin at #0.

For the ESQ-1, the DX-7, etc.

Mirage Program Number:	1	2	3	4
Load All Sound 1	1	4	7	10
Load All Sound 2	2	5	8	11
Load All Sound 3	3	6	9	12
Change Upper/Lower Program Number	13	14	15	16
Load Lower Sound 1	17	20	23	26
Load Lower Sound 2	18	21	24	27

True MIDI Program Change Numbers

Mirage Program Number:	1	2	3	4
Load All Sound 1	0	3	6	9
Load All Sound 2	1	4	7	10
Load All Sound 3	2	5	8	11
Change Upper/Lower Program Number	12	13	14	15
Load Lower Sound 1	16	19	22	25
Load Lower Sound 2	17	20	23	26

Load Lower Sound 3	19	22	25	28		Load Lower Sound 3	18	21	24	27
Change Lower Prog. No.	29	30	31	32		Change Lower Prog. No.	28	29	30	31
Load Upper Sound 1	33	36	39	42		Load Upper Sound 1	32	35	38	41
Load Upper Sound 2	34	37	40	43		Load Upper Sound 2	33	36	39	42
Load Upper Sound 3	35	38	41	44		Load Upper Sound 3	34	37	40	43
Change Upper Prog. No.	45	46	47	48		Change Upper Prog. No.	44	45	46	47

Note: Changing Programs remotely from a MIDI controller will cause the Mirage to display only the value of the program (1, 2, 3, or 4). The first digit of the display will be blank.

Example:

1. Set Parameter 84 on the Mirage to 2. This will allow key, controller, and program change information to be transmitted and received.
2. If you select Program 3 on the ESQ-1, it will cause the Mirage to load sound 3 and select program number 1.
3. Selecting Prog. 16 on the ESQ-1 changes the upper and lower programs of the Mirage to #4.
4. If you set Parameter 84 on the Mirage to 3, you must press the Up Arrow button on the ESQ-1 following the program selection before the Mirage will respond.

Loading Sounds and Transmitting MIDI Program Changes

You can load a sound from the front panel of the Mirage and select a program number at the same time. When you do so the Mirage will send a program change over MIDI.

When loading a Lower, Upper, or Both sounds from disk, you can select program 1, 2, 3 or 4 before hitting the ENTER button. When the sound finishes loading, the program you specified will be selected.

If parameter 84 is set to a value of 2 or 3, then loading a sound from the Mirage front pane1 will transmit MIDI program change information as outlined in the tables on the previous page. If you change programs with the upper/lower program link switch (parameter 25) set ON, then program changes 13 through 16 will be transmitted. If you change a lower program with the link switch set OFF, then program changes 29-32 will be transmitted. If you change an upper program with the link switch set OFF, then program changes 45-48 will be transmitted.

MODEL: Mirage DSK		**MIDI Implementation Chart**		**Date:12/15/86 Version: 3.2**
Function...		**Transmitted**	**Recognized**	**Remarks**
Basic Channel	Default Channel	1 1-16	1 1- 16	.
Mode	Default Messages Altered	1, 3	1, 3	.
Note Number	True Voice	36-96	36-96	Outside range, wraps in
Velocity	Note ON Note OFF	**O** **O**	**O** **O**	.
After Touch	Key's Ch's	**X** **X**	**O** **O**	.
Pitch Bender		**O**	**O**	.
Control Change	Wheel 1 Breath 2 3 Foot 4 5 6 7 Sus. Ped . 64	**O** **X** **X** **X** **X** **X** **X** **O**	**O** **O** **O** **O** **O** **O** **O** **O**	Programmable
Prog Change	True #	0-47	0-47	.
System Exclusive		**X**	**X**	.
System Common	: Song Pos : Song Sel : Tune	**X** **X** **X**	**X** **X** **X**	.
System Real Time	: Clock : Commands	**O** **X**	**O** Start, Stop, Cont.	Only recognized if synching to MIDI clocks
Aux Messages	: Local On/Off : All Notes Off : Active Sense : Reset	**X** **X** **X** **X**	**X** **O** **X** **X**	.
Mode 1: OMNI ON, POLY Mode 3: OMNI OFF, POLY		Mode 2: OMNI ON, MONO Mode 4: OMNI OFF MONO		**O** : YES **X** : NO

SPECIFICATIONS

Keyboard

- 61- note (C-C) polyphonic keyboard with velocity sensitivity

Voices

- Eight-voice polyphonic and polytimbral
- Panoramic stereo outputs

Sounds

- Waveforms derived from digitally sampled (recorded) acoustic or electronic sound sources.
- Up to 16 different sampled sounds available at one time.
- Four instantly-accessible programs per sound bank.
- Sounds stored on 3-1/2" diskette (3 upper and 3 lower sound banks per diskette).

Program Parameters

- Low pass filter control: cutoff frequency, resonance (Q), keyboard tracking.
- Low frequency oscillator: speed (frequency) and depth (amplitude) with depth assignable to modulation wheel.
- Keyboard control: master turning, pitch bend range, velocity sensitivity adjustment, upper/lower keyboard balance.
- Separate amplitude (loudness) and filter (brightness) envelopes
- Five independently controllable envelope parameters: Attack Rate, Peak Level, Decay Rate, Sustain Level, Release Rate.
- Dynamic envelope parameters controlled by key velocity or keyboard scaling, for both amplitude and filter: Velocity Sensitive Attack Rate, Peak Level, Sustain Level and Release Rate (key-up sensitive) as well as Keyboard Scaled Decay Rate.

Sampling

- Multi-sampling ability: up to 16 different wavesamples available at any one time.
- Sampling parameters: 20 individually adjustable parameters controlling sample time, memory assignment, looping, tuning and filtering.
- Sampling rate: variable from 10KHz to 33KHz
- Sampling time: variable from 2 to 6.5 seconds (per keyboard half).

MIDI

- MIDI In and MIDI Out/Thru connections
- Poly and Omni modes
- Full support of clock in and out, pitch and mod wheel changes, keyboard velocity, polyphonic pressure sensitivity, breath controller and sustain pedal
- Complete wavetable access and programming via external computer (with MASOS)

Sequencer

- On-board sequencer with 333-event memory
- Records pitch bend, modulation, sustain pedal, key velocity
- Multi-overdub ability
- Sync with external units via MIDI
- Sequences can be saved on Sound Diskettes.

Storage

- Sound, program and sequence storage on 3-1/2" microfloppy diskettes
- 3 upper bank and 3 lower bank sounds per diskette; four instantly accessible programs per sound; up to 8 sequences per diskette.
- Blank diskettes can be formatted with Ensoniq Disk Formatting Program
- Low profile disk drive built in
- ESQ-1 sounds and sequences transferred via MIDI to Mirage and stored on diskette

Dimensions

- 40.5" (103cm) wide x 4" (10cm) high x 13.5" (34cm) deep
- Weight: 24.75 pounds (10.8 kilograms)

Options

- Ensoniq Sound Library Diskettes: expanding library of sounds including keyboard, string, brass, reed, fretted, percussion and wind instruments as well as electric and electronic instrument sounds and special effects.
- Ensoniq Formatted Diskettes: for storage of player- created sounds, programs and sequences. Includes current version of Mirage operating system.
- Advanced Sampler's Guide: Detailed sampling guide and tutorial with Mirage Advanced Sampling Operating System (MASOS) software.
- Visual Editing Systems: software and instruction programs to visually display, edit and create waveforms with a variety of personal computers, including: Apple IIe, Macintosh, Commodore C64/128, Atari, IBM PC and compatible computers.
- Ensoniq Third Party Developers offer additional accessories including sound diskettes, visual editing programs, user groups, newsletter and on-line services. Contact your authorized Ensoniq dealer for more information.
- One year, parts and labor